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UNTO THE FOURTH GENERATION

COLUMBUS' FLAGSHIP
Did it import syphilis into Europe?

UNTO THE FOURTH GENERATION

GONORRHEA AND SYPHILIS

What the Layman Should Know

By

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⊛

With Illustrations by

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FIRST EDITION

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TO MY WIFE

MARY BURNS PUGIN

who ably assisted and encouraged me in this work, and

TO MY SONS

HENRY AUGUSTUS

AND

EDWARD NORTHMORE

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ARMSTRONG STATE UNIVERSITY

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PREFACE

WHY THIS "BOOK FOR THE LAYMAN" WAS WRITTEN

The importance of a knowledge of syphilis and gonorrhea is admitted. In the past few years a few informatory and quasi- informatory books and magazine articles for the layman mostly about syphilis were published under camouflaged titles. The opportunity is now ripe for an open discussion of these matters, as it is now hardly necessary even to refer to these infections as "The Social Diseases."

The previous writers, better called pseudo-medical writers have certain marked characteristics. They are strong on the history of disease and weave what they call romance around it and around the research men. They need little knowledge of a disease for this and in order to manufacture drama they often inadvertently or otherwise give much misinformation, as they do not expect to be brought to task by informed readers. They allege that they are writing *about these diseases* and they do write "round about them," rarely becoming informative, because they realize that the transmission of real medical information to a layman is difficult. Consequently after reading their publications one can not develop any *concrete information of practical value.*

But the question might be asked, "Should laymen

get the facts?" The author believes that this book will prove that they should.

But are the facts too advanced and too technical for laymen? The answer is that books on *all* the natural sciences, such as chemistry and physics, have been so written and acceptably received. Also general human anatomy, physiology and biology have been written in this manner for the layman. Informative books on the care and feeding of children have been of service and a comfort to millions of mothers. It is hoped that this effort has clarified these matters for the layman and has made this at times rather complicated material simple enough, so that it is intelligible to a reader, who will read informative non-fiction.

But again, why should the layman become informed *at all?* At present the lay press is seething with the subject of syphilis, and gonorrhea, although the latter subject has been but sparsely dwelt upon.

Why is this so and who is fomenting this activity? The Public Health men have started this publicity and have been showing how badly off the country is in regard to syphilis, *but only in regard to syphilis,* because this was the easier of the two diseases to treat, to cure or at *the very least to control.*

Their publicity resulted in or was followed by recent enactments of laws in regard to syphilis and marriage, and compulsory blood tests before the granting of a marriage license, with very little said about gonorrhea, which is of far greater import to the woman. This was partly because examination for gonorrhea required too much exposure of the person in order to detect the offender, the gonococcus. Laws of this type had already been in force

for years in certain western States, but it required their advent into the East, and especially into New York, to make real front page news, with syphilis in large type and gonorrhea in type so small that it hardly registered on the attention of the public. Then the New York law on the compulsory testing of the blood of pregnant women for syphilis was passed and fortunately it was not required that the result of the test be written into the child's birth certificate, which might of course have caused disaster in after years.

This book is not a propagandic but an informative book. Its object is information along many lines:

First, it attempts to impress the fact that these conditions should be looked on primarily as infections, just like pneumonia, and not as shameful infections, "the wages of sin."

Second, in giving this information to the layman we are enlisting him as a soldier in the battle for private health. We are not uninterested in Public Health but are much more interested in private health, which has not been sufficiently publicized.

Third, the earliest diagnosis and earliest treatment can only be accomplished, if the individual is armed with real information and is taught how to use it and uses it properly.

Fourth, there is no attempt to make a physician out of the reader, nor could it be accomplished by his reading of this book alone, but he is shown the importance of seeking early adequate advice and of leaving the treatment, if necessary, to those properly trained in it.

With such an end in view we are sure that the book has a place, provided that we have been able to

accomplish our end: that of stating the facts in simple language, accurate and as free of statistical information as seems advisable.

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INTRODUCTION

WHY THE LAYMAN SHOULD READ THIS BOOK

This is a book about gonorrhea and syphilis written primarily for the layman in terms as simple as possible. It is timely as the subjects are in the public eye.

This is an era in which prudery has no place. Victorian bashfulness, an outgrowth of the Puritanism of seventeenth century England and New England, is now as dead as the Middle Ages. Public Health measures and efforts are now matters to be understood and reckoned with by the individual as they are for his good.

These diseases have lost some of their stigma because during the Great War the practice of precautionary measures was considered too vital and urgent for these matters still to be discussed in whispers. They had to be brought out into the open. Very recently the words syphilis and gonorrhea have been appearing on the front page of metropolitan newspapers.

Gonorrhea and syphilis *were* terms of stigma until it was realized by the public that they were *infections* and that the germs could be transmitted unknowingly or innocently and *worst of all* could likewise be re-transmitted, if harbored unknowingly or incompletely eradicated. The harborer of these dis-

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eases, like the tuberculous patient, is only a menace if he is ignorant, careless or viciously unwilling to coöperate with society.

European dramatic writers in the latter part of the nineteenth century, like Ibsen in "Ghosts" and Brieux in "Damaged Goods" were forced to call attention by veiled description to the results of harboring such infections.

They could not even mention the name of these diseases however they might have been acquired. Particular attention was called by them to the transmissibility of these diseases to the offspring. This was as far as they dared go, and to mention the names of these infections was so taboo at that time, that it is difficult from their plays to identify the disease with the seriousness of which they were attempting to acquaint the public.

This decade prefers to call a spade a spade, rather than be injured and bear the consequences. It fears not to put the words syphilis and gonorrhea on the front page of any newspaper, whereas previously they were used only in the consulting room of the physician.

This book is not an attempt to condone the acquisition of these diseases, if due to misconduct or anything like it. It merely states that these diseases are prevalent and *can* be a menace to the harborer as well as to those around him. There is objection however to an individual retaining these infections, especially in a transmissible stage or state, and not being treated through ignorance, fear or for any other reason. Fortunately metropolitan newspapers and feature articles in outstanding and up-to-the-minute periodicals and magazines do not fear to print the

words syphilis and gonorrhea on their front and title pages. What is the meaning of this? It means that prudery is dead, and that knowledge is acceptable to and desired by the laity.

It is not enough however to know the words syphilis and gonorrhea as mere labels. The layman should know something about their acquisition and manifestations, and also their transmissibility to others and especially to offspring as well as the symptoms manifested in the offspring, because early diagnosis simplifies everything, especially their eradication, whereas in the later and more complicated stages of these diseases the slowness of attaining results by treatment has given an incorrect impression to both layman and physician that these diseases are incurable, whereas they have merely become chronic, which, following the Greek, means not *incurable* but *of long standing*.

The attention of Public Health authorities to the health of the individual will achieve better results if the individual offers his coöperation willingly. How can he offer it, if he has no knowledge of the symptoms of these diseases? If there is to be a fight against syphilis and gonorrhea, the private soldier should be armed, and knowledge is his weapon.

This book is to make it clear that stigma has no place in the fourth decade of the twentieth century in a consideration of the so-called Venereal Diseases, because not all gonorrhea and syphilis is communicated by misconduct and because infection knows no theological law and can work havoc regardless of how acquired.

This is not a book for physicians. It is written primarily for the *layman* in *words of one syllable,*

so to speak, explaining to him with as little technical language as is possible the situations that may occur; giving him a little background and making clear to *him* that often slight symptoms should be investigated, as in these diseases time is a great factor to be reckoned with, because the ease and speed of eradication depends chiefly on the early diagnosis and duration of the condition.

It is clearly shown that these diseases are not local but general infections, or at least they affect organs quite remote from the point of entry. Also an attempt is made to inform the layman that these diseases, unlike some others with which he is familiar, like measles, are rarely, if ever, self-limited, which means that nature can and ordinarily does overcome them, but that they unfortunately become quiescent even for decades, while they quietly work havoc upon vital organs, "digging in" in such a way that the eradication of the germs is difficult and often questionable, and worst of all the damage wrought upon vital organs may be irreparable.

An attempt is made to impart this information in a style such as a well informed physician would use in his consulting room in giving to a sensible and intelligent layman a bird's-eye view of the entire field, if either of them could afford this much time for such a heart-to-heart talk.

This information is harvested from many standard sources, but is checked up and *winnowed* by a quarter of a century spent by the author in observation and treatment of these conditions.

The importance of treatment is stressed but its details are not outlined as this is the field of the practitioner of medicine. This book is not a Home

Remedy Family Almanac. The layman is no better equipped to self-treat these devastating diseases than is the pharmacist or druggist who often wrecks the life and career of a good customer by over-the-counter prescribing; and a plea is here made that the Federal Government regulate the sale of many drugs in addition to habit forming narcotics like opium, as it has already done by the Harrison Anti-narcotic Act.

So with this program and end in view let us unfold the situation with a desire primarily to shed light, expecting coöperation from the individual after his enlightenment.

Social control is not our function but that of governments.

Glossary of Medical Terms

AMBOCEPTOR: A type of antibody which develops in the blood on the occurrence of infection with certain germs; syphilitic amboceptor is a notable example.

ANTIBODY: Any defensive material developed in the blood of an individual, who has had certain diseases or who has been injected with certain materials foreign to himself.

ANTIGEN: One of the important fluids (reagents) used in making blood examinations for syphilis and other diseases. The acetone-insoluble fraction antigen devised by Noguchi is an especially valuable and trustworthy type.

ARSPHENAMINE: Another term for Salvarsan, the famous "606" of Ehrlich; a valuable arsenic containing drug used in the treatment of syphilis. It is one of the drugs known as "arsenicals."

BACTERIEMIA: The presence of live bacteria (germs) in the circulating blood.

BACTERIO-PROTEIN: The protein contained in the bodies of bacteria or germs. (See: protein.)

CARTILAGE: A semi-solid and moderately firm type of smooth glistening tissue that covers the ends of bones where joints occur. It also forms the architecture of organs, like the nose, in the place of or in conjunction with bone.

CELL COUNT: The enumeration of the number of cells in blood, spinal fluid, urine and other fluids.

CENTRAL NERVOUS SYSTEM: The brain and the spinal cord.

CEREBRO SPINAL SYPHILIS: Irregular types of brain and cord involvement not diagnosticable as paresis or tabes.

CERVIX: Literally it means the neck; usually the neck of the womb, which lies and empties deeply within the vagina.

CHANCHROID: An ulcerating and usually very destructive ulcer which appears on the genitals. It is usually soft and not caused by the germ of syphilis. It is a local disease, caused by Ducrey's bacillus.

CHANCRE: The lump (usually the ulcer) that appears on any part of the body after inoculation with the spirochaeta pallida; it usually occurs on the genitals and is hard.

CHEMOTHERAPY: The treatment of diseases by the internal administration of chemical substances (e.g.: mercury, arsenic, etc.).

CHOLESTERIN: A type of fatty-like substance found in antigens made by extracting heart muscle with alcohol. Its use sensitizes the Wassermann test on the positive side.

CHOROID: The dark brown coat of the eye-ball just next to the retina, which it nourishes by means of its blood-vessels.

COCCI: Bacteria which are round; shaped like a ball.

COLLOIDAL GOLD TEST: A test for syphilis performed on the spinal fluid. It was devised by Lange.

COLUMNAR EPITHELIUM: A definite variety of cell

which covers the surface of certain mucous membranes (See: mucosa).

CORNEA: The clear rounded transparent portion of the front of the eye-ball.

CRYPT: Literally a cavern or hollow place where things can be hidden. Refers to tiny hollow places in the wall of the urethral tube.

DARK-FIELD MICROSCOPE: A special type of microscope for examining fluids by reflected light.

DURA: Other term: dura mater. The strong glistening parchment-like membrane which lines the inside of the skull and spinal column.

FALLOPIAN TUBE: See: tube.

FETUS: The offspring developing in the womb.

FOLLICLE: A tiny mass surrounded by a membrane and containing fluid or semi-solid material. (See: Graafian follicle, urethral follicle.)

FONTANELLE: Areas on the head of an infant where the flat bones which form the skull have not completely joined together. These places are soft and pliable because they are closed merely by a membrane.

GENERAL PARESIS: See: paresis.

GIEMSA STAIN: A combination of aniline dyes used in staining blood cells for microscopic examination.

GLOBULIN: One of the chemical components of living matter similar to albumen; occurs in the spinal fluid in certain diseases. (See Nonne's test; Noguchi's test.)

GONORRHEA: A disease, usually of the genitals, caused by a specific germ, the gonococcus.

GRAAFIAN FOLLICLE: A minute follicle (egg or ovum) that exists in vast numbers in the female

ovary. One or more of these are extruded into the tubes at the beginning of each menstrual period. They must be fertilized by the male sperm to produce offspring.

GREAT STERILIZATION: Other term: Therapia Sterilizans Magna. An idea held by Ehrlich that all spirochaetes in the body could be killed by one dose of an arsenical (Salvarsan).

GUMMA: An inflammatory mass of syphilitic tissue occurring in a tissue or organ; often looks like a tumor (neoplasm); occurs only in the late or tertiary stage of syphilis.

HERPES: A rash of the skin consisting of tiny vesicles (blisters); common on the skin of the penis and called herpes preputialis (of the prepuce).

HERXHEIMER REACTION: A reaction that occurs sometimes in syphilis shortly after an injection of "606" (Arsphenamine). It is usually the sudden appearance of a pinkish rash, but occasionally may be deafness. Considered to be due to the destruction of large numbers of spirochaetes by the drug.

IMMUNIZATION: The process of rendering an individual resistant to a disease germ. If due to having recovered from the disease it is termed *active immunization*; if conferred by inoculating the individual with an antigen or vaccine or its equivalent it is termed *passive immunization.*

INTRAVENOUS: By way of the veins; many medicines are now injected directly into the veins, usually at the bend of the elbow.

IRITIS: Inflammation of the iris. The iris is the pig-

mented diaphragm that gives color to the eye. It regulates the amount of light that enters the eye.

KAHN TEST: A flocculation test for the diagnosis of syphilis done on the blood serum and the spinal fluid.

LANGE TEST: See colloidal gold test.

LATENT: Dormant or hidden. A *latent lesion* is one that cannot be found by physical examination. (See tertiary latent syphilis.)

LEUCOCYTE: A white cell of the blood. Certain leucocytes (the polymorphonuclears) are often called pus-cells because, when they succumb in large numbers to bacteria, they form pus.

LOCOMOTOR ATAXIA: A syphilitic disease of the spinal cord which is manifested by a very unsteady gait and other symptoms and signs. Another term is tabes dorsalis.

LUMBAR: The loin region. Used particularly of the lower portion of the spinal column. (See lumbar puncture.)

LUMBAR PUNCTURE: Another term is spinal puncture which is a procedure by which spinal fluid is removed by puncture of the back with a long needle.

LYMPHATICS: Tubular vessels like veins which transport a clear fluid called lymph. In their course there are small masses called *lymphatic glands* (*lymph nodes*) which have much to do with the trapping and destruction of bacteria.

MILLIMETER: A unit of metric system measurement. It is 1/1000th of a meter, or a little more than 1/32 inch.

MUCOSA: The smooth inside lining of any internal organ or duct in the body. It corresponds to the skin of the outside. Examples are the linings of the mouth, vagina, intestines, etc.

NEURO-SYPHILIS: Changes that occur in the nervous system due to involvement by the spirochaete.

NOGUCHI'S TEST: A chemical test for globulin in spinal fluid.

NONNE'S TEST: A chemical test for globulin in spinal fluid.

NORMAL SALT SOLUTION: Other term: normal saline. A solution of sodium chloride (table salt) in water which has the same tone as the blood.

OPHTHALMIA: An inflammation of the eye with the production of pus. In the new-born it is called *ophthalmia neonatorum.*

OVARY: The female organ which produces the eggs by means of its Graafian follicles.

OVUM: Literally an egg (plural ova). There are hundreds of these ova in each human female ovary. (See: Graafian follicle.)

PARESIS: Literally, partial weakness of a muscle. Usually synonymous with general paralysis of the insane or softening of the brain. A syphilitic disease of the brain which results in loss of mentality, delusions and marked bodily weakness. It is rapidly fatal.

PENIS: The male organ of copulation.

PERINEUM: The region just in front of the anus.

PERIOSTEUM: The membrane that covers any bone. Its inflammation is known as periostitis.

PHAGOCYTOSIS: The phagocyte is a white blood cell which engulfs and destroys bacteria. Phagocy-

tosis literally means the process of "scavengering."

PIA: The delicate membrane that covers the brain and spinal cord; other term: pia arachnoid.

PROSTATE: A gland situated at the neck of the male bladder.

PROTEIN: One of the three important chemical materials out of which living matter is formed.

PSORIASIS: A chronic scaly disease of the skin.

PUBES: The region near the genital organs, which is covered by hair.

PUPIL: The opening in the iris, which lets light into the eye.

RADIOPAQUE: Solid or fluid materials which the X-Rays will not readily pass; this is due to their high atomic weights.

RECTUM: The lower end of the intestinal tract.

RETINA: The sensitive nerve layer in the inside of the eye that is the basis of perception of light and images.

SCROTUM: The sac that contains the testicles.

SEMEN: The fluid produced by the male at the end of coitus.

SEMINAL VESICLES: Two small glands located near the male prostate.

SEROLOGIST: A laboratory worker who makes serum tests.

SERUM: The fluid material that separates, when blood clots.

SKENE'S GLANDS: Two tiny glands on either side of the tip of the female urethra.

SPERMATOZOON: The male element in semen that fertilizes the Graafian follicle (egg) of the ovary.

SPINAL COLUMN: Synonyms are spine and vertebral column.

SPINAL CORD: The continuation of the brain downward; it is found in the center of the vertebral column.

SPINAL PUNCTURE: See: Lumbar puncture.

SPINE: The back-bone.

SPIROCHAETEMIA: Invasion of the blood stream with spirochaetes.

STERILE: Unable to produce offspring. The fault may be either that of the male or the female.

TABES DORSALIS: See: Locomotor ataxia.

TERTIARY LATENT STAGE: The third stage of syphilis, which is usually latent throughout most of its duration of years.

TESTICLE: The male sexual organ which produces the spermatozoon, the male element necessary for reproduction. Other term: Testis.

TITRATE: To determine the strength of a chemical material in solution, without evaporating it to dryness.

TUBAL INSUFFLATION: The procedure of blowing air or other gases through the Fallopian tubes by way of the cervix.

TUBE: The Fallopian tubes of the female which connect the ovaries with the womb.

URETHRA: The tube which empties urine from the bladder.

URETHRASCOPE: An electrically lighted tubular instrument designed for examining the interior of the urethra.

UTERUS: The womb.

VACCINE: A fluid containing the dead bodies of bacteria; it is used in treating disease.

VAGINA: The outlet of the female genital tract.

VAGINITIS: Inflammation of the vagina.

VAS DEFERENS: The tube leading the semen from the epididymis of the testicle. In its course it widens out into an ampulla and is joined here by the duct of the vesicle. This common (ejaculatory) duct empties the semen into the prostatic urethra at the end of coitus.

VERTEBRA: One of the bony units or segments that make up the spine or vertebral column.

VESICLE: (See: Seminal vesicle). Also a skin disease with blebs (like herpes).

WASSERMANN: A test for syphilitic amboceptor made upon the blood or spinal fluid.

BOOK I. GONORRHEA

THE MICROSCOPIC DIAGNOSIS OF SYPHILIS AND GONORRHEA

On the left: The Treponema pallidum (or Spirochaeta pallida); the protozoon or germ of syphilis. Note that this protozoon is represented on a dark or black ground, due to the fact that the dark-field microscope is used.

On the right: The gonococcus of Neisser, the germ causing gonorrhea, is seen in a bright field with the ordinary microscope. Note that some of these coffee-bean shaped cocci are within the leucocytes or pus-cells.

INTRODUCTION

IS GONORRHEA IMPORTANT?

Recently there has been a great deal of publicity, a drive on syphilis, in which the seriousness of the disease has been stressed; fear of it has been instilled into the minds of the public, a certain amount of prudery has been eliminated in handling the subject and the question of Federal control of the disease is at present before Congress.

To one not previously interested in these matters of public and private health it would seem that there was but one venereal disease of importance and seriousness. We do not intend to go at this point into the reason for the levelling of the guns upon syphilis although we feel that we understand the reasons underlying this policy.

The question now to be answered is "What about gonorrhea" another of the several sexual diseases? Regardless of the cause of the accent on syphilis, is the reason for soft-pedalling the publicity concerning and the control of gonorrhea due to the fact that this disease is merely an inconvenience and a matter lightly to be considered?

The description of gonorrhea which follows this chapter gives its mode of transmission and a picture of its course, complications, morbidity and mortality.

In this introduction we intend to ask and to answer certain questions, which will flash before the eyes of

the public certain high-lights, the purpose of which is to indelibly mark upon their consciousness the fact that gonorrhea is not a *trivial complaint* to be shunted into the background, but that compared with syphilis it ranks higher in numerical incidence, has a greater morbidity, is almost the chief cause of blindness, *is* the chief cause of sterility in both sexes, causes more invalidism, is the cause of more surgical operations and probably diminishes the span of human life as greatly as, if not more so than, its dreaded and publicized co-worker and rival, syphilis.

As has been pointed out before, the sexual diseases are in most instances transmitted during coitus, because in both syphilis and gonorrhea the germs, unlike those of most other communicable diseases such as tuberculosis, do not survive long outside of the body. In non-sexual transmission, the germ must consequently be transmitted from objects and utensils on which the germ-laden discharges have been *rather recently* shed.

It is a rather futile thing to attempt to create new terms in order to obviate the odium attached to well established terms such as *venereal.* It seems better to define these terms that are under fire and to explain that venereal does not always mean a matter of misconduct, and that the transmission of these diseases, even though it may involve coitus, is not tinged with moral turpitude. In other words these diseases are *infections* more or less like pneumonia or typhoid and the substitution or introduction of a new term, such as *genitoinfectious* may be scientifically accurate, but it will not prevent most writers from using the term *venereal.*

In gonorrhea, par excellence, the infection may be

transmitted *quite innocently in coitus* from either sex to the other, chiefly because of the difficulty in accurately determining the exact moment at which the gonorrheic becomes a non-gonorrheic. This difficulty is greater in gonorrhea than in syphilis, because as will be explained later there is no method by which even experts can render the gonorrheic quickly or temporarily non-infectious, such as is possible in syphilitics; *the individual is either completely cured or he is still gonorrheic.*

Next, gonorrhea may be transmitted innocently through carelessness in a definitely non-venereal manner, although fortunately this is a rather rare occurrence.

In order to bring dramatically to the attention of the reader the vast importance and seriousness of gonorrhea we return to the questions, which we propose to ask and answer, if they require an answer.

Did you know that gonorrhea and syphilis are two distinct diseases? Neither can develop into the other, nor are the symptoms of one due to infection with the germ of the other. The historical chapter on syphilis will narrate the unfortunate experiment of Hunter and his more unfortunate conclusions, which set back the clock of diagnosis and differentiation of the two ailments nearly a century, only to be set right in the middle of the nineteenth century chiefly by the masterly work of Philippe Ricord.

Did you know that gonorrhea is not merely a *discharge* but a *disease* affecting both sexes and many remote parts and organs of the body? That these manifestations under other names are *still gonorrhea?* A realization of the fact that distant organs such as the female generative organs, and even the heart,

may be affected by the germ of gonorrhea should show the stupidity of the idea that gonorrhea is no worse than "a bad cold." This is chiefly woman's burden.

Did you know that gonorrhea is at the bottom of some cases of so-called chronic rheumatism, particularly the type that stiffens the spinal column and numerous other important joints and renders the victim a permanent invalid? This is not an uncommon occurrence. It is chiefly man's burden.

Did you know that most of the involvements of the female organs of generation (the tubes and ovaries) are caused by gonorrhea? That these "so-called female complaints" result in abdominal operations? That up to 50% of the abdominal operations performed on female adults are due to and for the cure of the results of gonorrhea? That the percentage of mortality in these operations is not to be ignored?

Did you know that stricture of the urethra in young males (an obstruction to the passage of urine) is nearly always caused by gonorrhea? That it usually occurs or becomes serious in the third decade of life and in the course of its treatment, surgical or otherwise, death may result due to blood-poisoning and other causes? That such a complication in a young person lessens the span of life several times as many years as the complications of syphilis, that have mortality, are likely to lessen it.

Did you know that the inability of both males and females to produce children is due mostly to previous attacks of gonorrhea on the part of one or the other party? That the gonorrheic woman may produce one child but is often unable to produce another

(one child sterility) due to the ensuing inflammation of the tubes which may cause them to be blocked in certain portions? That such tubes may later rupture and cause death from hemorrhage unless operated upon successfully as an emergency case?

The above described are all complications that occur due to the sexual transmission of the gonococcus and we are very skeptical as to the transmission of gonorrhea to the urinary and sexual organs of adults by a non-venereal method. However gonorrhea of the eyes and gonorrhea in small girl children certainly fall into the innocent non-venereal group and are fairly frequent as well as most disastrous.

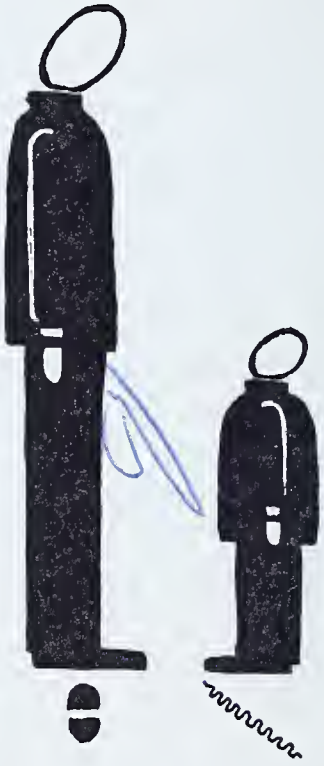
Did you know that gonorrhea can manifest itself as a slight genital discharge in female infants and little girls? That it is nearly always transmitted by nurse-maids or attendants who bathe and care for the children? That it can run riot in orphanages and even in hospital wards? That these children if not quickly cured can be irremediably damaged?

Did you know that barring industrial accidents, gonorrhea is the most important cause of blindness?

Did you know that the gonorrheic woman is very likely to infect her infant during its birth? That the preventive treatment of the eyes of all new-born infants does not prevent infection in all cases? That gonorrhea causes many more cases of blindness than syphilis and usually causes it at birth?

Did you know that any eye-inflammation in infant or adult, which is manifested by a discharge of pus from the eye, may be gonorrhea and is nearly always accidentally and innocently acquired from a member of the family or a servant who is not completely cured? It may of course also be self-inoculated by

an individual who is actively gonorrheic and who is careless in the hygiene of his hands. That physicians,



THE NUMERICAL INCIDENCE OF GONORRHEA AND SYPHILIS

Notice the gonococcus under the larger (gonorrhoic) and the spirochaete under the smaller (syphilitic) figure, which latter is being looked down upon. Based on reports from 26 of the United States in 1934 there were reported in that year 1,037,000 new cases of gonorrhea and 518,000 new cases of syphilis to the Health Departments. U. S. Treasury Department; Public Health Service, Venereal Disease Information, Vol. 17, 1936.

However the number of cases of gonorrhea is at least four times that of syphilis.

nurses and attendants are always in danger of such eye-infections?

So, if the preceding has not brought to the attention of the reader the fact that gonorrhea is at least as important as, if not more important than syphilis, the fact that gonorrhea far outranks syphilis in the number of its occurrences and that its uncured and still infectious cases do outnumber those of syphilis should banish the idea that it is a *"trivial complaint."*

The forthcoming chapters will outline gonorrhea as it is, and we hope in clear and simple terms for the lay reader. We may elsewhere go into the reasons why the importance of gonorrhea has not been publicized, but these forthcoming pages will show that such neglect is not justifiable.

CHAPTER 1

GONORRHEA: HISTORICAL DATA

Unlike syphilis, the disease gonorrhea was clinically recognized in very ancient times, and is recorded in the medical literature of the ancient Greeks and Romans.

Galen (A.D. 160) is accredited with having named the disease but according to some authorities the term came down to him from the days of Hippocrates (460 B.C.) The term gonorrhea is however really a misnomer. It is derived from Greek words which literally mean "a flow of semen." It was thought that the discharge which *we* know to be pus, was really a loss of the semen or seminal fluid of the male. This we know is *absolutely not the case.*

Even if gonorrhea had not actually been known by that name before the time of Galen, there are enough descriptions to show that it was recognized as a distinct disease.

It is found in the records of the Japanese (900 B.C.), of the early Egyptians and also of the Romans. In the Old Testament of the Bible and in the Talmud, it is encountered in reviewing the regulations in regard to personal hygiene.

The sexual promiscuity of the ancient Greeks and Romans is well known and there can be no doubt that gonorrhea was one of the sequelae of their feasts and Saturnalian revelries.

All written documents of antiquity recognize the contagiousness of the complaint and its relation to sexual contact.

Among those ancient writers who have mentioned or described the disease might be mentioned: Herodotus (484-425 B.C.), Plato (427-347 B.C.), Aristotle (384-322 B.C.) and Celsus (A.D. 164).

In the Middle Ages, Maimonides (A.D. 1134-1204) may be mentioned as one of those who first doubted that the discharge was seminal fluid. However, through the Dark Ages, knowledge of all sorts and naturally knowledge of the nature of gonorrhea and its treatment made little progress.

The violent outburst of syphilis in Europe at the end of the 15th Century frightened humanity into trying to learn all that could be learned about venereal complaints.

After 1493 numerous scholarly studies on syphilis appeared but it was only too evident that syphilis and gonorrhea were confused with one another. Even the great English physician, Sydenham (1624-1689), considered gonorrhea a sympton of syphilis.

Haschard (1554) however attempted to show that the two diseases were separate and distinct, but the famous experiment of John Hunter (1767) gave an incorrect conception which was held as dogma by the medical profession for nearly a century, ~~until the time of Philippe Ricor~~d (1800-1889).

Hunter's experiment consisted of lancing and inoculating himself with the pus of a gonorrheic who unfortunately happened to be a syphilitic. He developed both diseases and naturally concluded that the two diseases were identical.

Bell (1749-1806) was among the thinkers, however, who refused to accept the dicta of Hunter. He had inoculated himself with gonorrhea and produced the disease but failed to produce syphilis.

Hunter's idea persisted pretty well up to nearly the middle of the 19th Century when it was finally overthrown by Ricord for all time. He inoculated 2500 patients with gonorrhea from every possible source and was unable to produce syphilis in a single instance.

Ricord's experiments were of course on the threshold of, but not within, the era of Pasteur and the bacteriological period.

It remained for this era to identify the gonococcus.

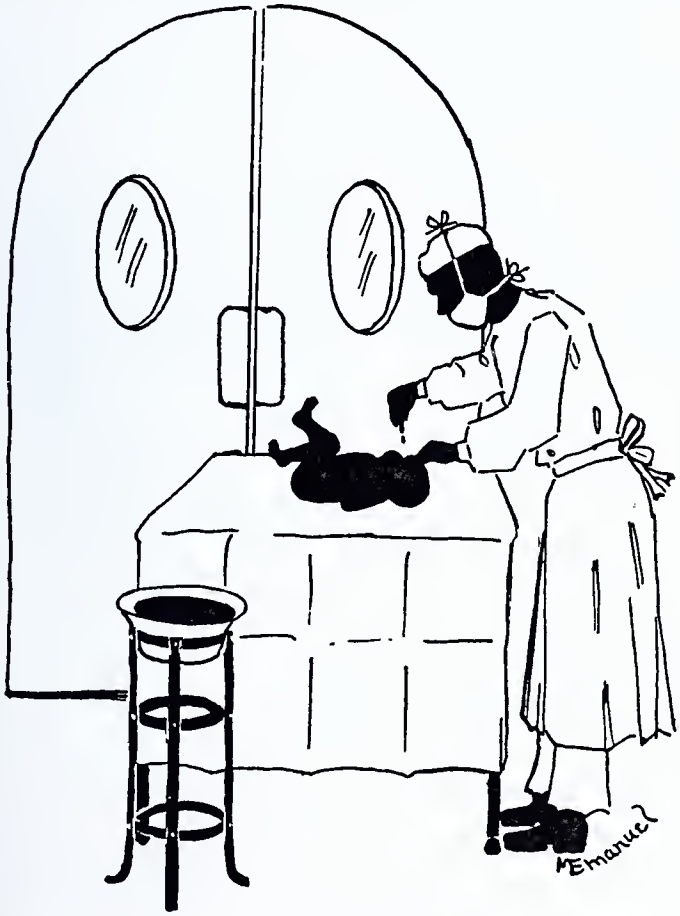
Neisser (in 1879) described the gonococcus as the specific cause of gonorrhea, a monumental discovery, and it was later shown by other investigators that the genital and urinary tracts in both sexes could be infected by other types of bacteria, but that the condition produced was different from gonorrhea and could and should be differentiated from gonorrhea.

The records of the ancients, which describe gonorrhea, describe the disease *only in the male.* The forms that it takes in the female were not recognized. To Noeggerath (1872) belongs the credit for calling our attention to the forms which the disease takes in women, in which sex the disease exacts its severest toll.

The end of the 19th and the beginning of the present century have been devoted mostly to attempts to discover and produce methods and drugs for the prevention, control, treatment and cure of gonorrhea.

Most of the drugs advocated have been discarded.

Among those that remain are permanganate of potassium and salts and albumenates of silver.



THE PREVENTION OF BLINDNESS IN THE NEW-BORN BY CREDE'S METHOD OF EYE-PROPHYLAXIS

The treatment of the eyes of the new-born infant by instilling drops of silver nitrate or other silver preparations prevents gonococcal inflammation of the eyes in most cases.

The chief advances have been along the lines of surgery upon the various organs. In the male this surgery has been more or less conservative but in the

female the surgical procedures upon the female organs have of necessity been more radical due to the destructive changes which the germ causes in the womb, tubes and ovaries.

One of the most recent drugs advocated for the treatment of gonorrhea is sulfanilamide. It has worked well in some cases but it is too soon to evaluate it. At present it seems certain that great changes in its use will have to be made before it will be satisfactory or as satisfactory as it promised to be.

At present it can certainly not be termed a specific for the gonococcus, as Salvarsan has proved itself to be for the spirochaeta pallida, as its failures are numerically too great.

No historical note on gonorrhea would be complete without going into the subject of the infection of the eyes by the gonococcus and its prevention and treatment.

Although it is claimed that certain physicians in the last half of the 18th Century noted a connection between gonorrhea in pregnant women and the development of discharges of pus from the eyes of their new-born shortly after delivery (ophthalmia neonatorum), yet it remained for investigators in the first half of the 19th Century to really bring it to the attention of the medical profession. Notable among these was Crede who by 1855 had already begun the work, which resulted not only in popularizing the knowledge of the connection between gonorrhea in the mother and purulent inflammation of the eye of her new-born but also the method of prevention of this most prevalent cause of human blindness. This method is the instillation of solution of nitrate of silver into the eyes of every new-born infant.

This was just before the bacteriologic era, as the germ of gonorrhea was not discovered by Neisser until 1879.

The actual finding of the gonococcus in the purulent discharge of inflamed eyes should probably be credited to Bokai and Finkelstein (1880).

DIMINUTION IN THE NUMBER OF CASES OF BLINDNESS AFTER THE USE OF CREDE'S METHOD OF PROPHYLAXIS

Gonorrhea of the eyes contracted at birth accounted for the blindness of 28.2% of the students of Schools for the Blind in 1907; but the incidence decreased to 9.3% in 1930, due to the more general and systematic use of Crede's method. Journal of Social Hygiene, Vol. XVII, No. 3, March, 1931.

The relationship of gonorrhea in men and disease of the female genitals, particularly of the tubes and ovaries, was best brought to the attention of the medical profession by Noeggerath (1872) seven years before Neisser's discovery of the gonococcus. Later the work of Bumm (1885-1887) served to substantiate the causal relationship between the gonococcus and disease of the female adnexa.

The most important recent advances in the eradication of gonorrhea have been made in the United

States Military Service along the lines of the *prevention* of the disease. In the Navy quite some time before the outbreak of the Great War of 1917 experiments had been in progress directed primarily toward the prevention of syphilis in recently exposed sailors, by the use of drugs such as Metchnikoff and Roux had used in preventing syphilis in experimentally inoculated anthropoid apes. In addition to the prevention of syphilis it was found that these same drugs had a markedly prophylactic or preventive effect on the development of gonorrhea.

In the Army other methods of prophylaxis were used with different technic, but with approximately equal success.

It is our feeling that this piece of preventive medicine, carried out clinically in our military services, equals in importance that masterly work done with typhoid bacillus vaccine in the British army during the Boer War.

The present openness of discussion of venereal diseases in the lay press during the last year, has been due to the drive against syphilis, and the desire of Public Health Authorities to get adequate appropriations for the eradication of adult syphilis and for the prevention of syphilis in the new-born. Due to this frank discussion and healthy publicity it has been possible to put through certain Public Health legislation in some states.

Gonorrhea has of course benefited to a certain extent in this publicity although more or less indirectly along with syphilis, *because it also* is a venereal disease. However the big guns have not been levelled primarily and directly against gonorrhea.

It has not been thoroughly brought to the atten-

tion of the public that gonorrhea is really *"not merely an annoying affair,* that ought to be gotten rid of, to be sure." The public has however been left in blissful ignorance of the fact that this so-called "rather trivial complaint" vies with and even outstrips the great plague, syphilis, in numerical incidence, in morbidity, in economic cost, in causation of blindness, as a cause of operations chiefly in women, and of invalidism and mortality in young people.

It is in a way the chief purpose of the following chapters of this book to bring these facts to the attention of the intelligent public.

The prevention of gonorrhea is rather easy. The cure is difficult.

CHAPTER 2

THE GERM OF GONORRHEA AND ITS TRANSMISSION

The gonococcus, the germ that causes gonorrhea, like that of syphilis, specializes in producing the disease only in *human beings*. In them it *ordinarily* produces discharges from the genital organs of both male and female, but can also infect the eyes, causing disastrous results. Animals may be inoculated with it, but a disease can not be produced which will in any way imitate human gonorrhea.

Gonorrhea of the genitals has been produced experimentally in the human.

The germ can be identified under the microscope as a coffee-bean shaped germ occurring in pairs. It can be grown on special culture media in the laboratory. It must be carefully nurtured however as it dies easily.

Outside of the human body in discharges on clothing and other objects, the germ *dies easily* and *quickly* and does not withstand cold, sunshine, soap, water and even mild antiseptics. It is just the opposite *within* the human body. Here it is *most difficult to kill and eradicate*.

It can be transmitted *only from person to person* and for practical purposes only by sexual contact. The two chief exceptions to this usual method of transmission are gonorrhea of the eyes and gonorrhea of the genitals, vaginitis, in small girls.

Gonorrhea of the innocents

The eyes of the new-born may be infected as the head of the child passes through the birth-canal of the mother during labor.

Gonorrhea was the cause of most blindness in children before it was discovered that this inflammation of the eyes of the new-born (ophthalmia neonatorum) could be nearly always prevented by instilling several drops of silver nitrate, or other preparations of silver into the eyes of the baby immediately after birth. This is an almost sure preventive, although it has been found that treatment of the gonorrheal mother during pregnancy is of benefit to the child in the prevention of eye infection.

The same type of eye inflammation can occur in older children, the infection being carried by the fingers, and can occur in adults who have the disease and infect themselves and also in physicians or attendants, who come in contact with these cases while treating them.

The results upon the eyes vary from slight or severe scars of the cornea of the eye to complete destruction and shrinking of one or both eye-balls, often necessitating surgical removal.

Girl infants and children may become infected by attendants. They develop an infection of the genitals, with discharge of pus containing the germ and this is a most unfortunate and stubborn malady. It can occur in any class of society and can play havoc in the wards of hospitals for children.

Strong doubt should be thrown upon infections of the genitals acquired from bath tubs and toilet

seats, although this is remotely possible in women and girl children.

The gonorrheal germ cannot affect the nose, throat and mouth, but can cause a severe infection of the rectum, known as gonorrheal proctitis.

As a rule the germ's habitat is the genital organs. But it can enter the blood stream, like the germ of syphilis, and when it does it usually causes inflammation of the joints.

In rarer instances it can attack the lining, usually the valves of the inside of the heart. These cases are very rare and in our experience, all have succumbed.

CHAPTER 3

HOW GONORRHEA ORDINARILY MANIFESTS ITSELF

Simple uncomplicated gonorrhea in the male invariably attacks the urethra, the tube leading from the bladder to the outside, and *is venereal in origin.* The germ does not require any break in the inner lining of the tube in order to take hold; this has been proven experimentally.

The incubation period:

From the exposure to the first symptom requires *at least* three days, and is usually 3 to 7 days; cases occur with incubation periods up to 14 days, but this is exceptional.

One fact stands out, that if the symptoms start the *next day after exposure* it is almost certain that it is *not* a new infection by the gonococcus, but a *relapse* of a former *uncured* infection.

There are also discharges caused by other germs and in these the incubation period may be either before the third or beyond the seventh day after exposure; the microscopic study of the discharge shows that they are due to other germs and these are called *non-specific* infections, and they may be very stubborn and have many complications.

Gonorrhea in the male invariably begins as a urethritis, an inflammation of the urethra. Within 2 to 3 days there is a tickling sensation to which the patient's attention is finally drawn by a slight burn-

ing sensation as the urine is passed. At this time, in between urinations, if carefully examined, a thin watery or serous discharge will be noted. The gonococcus can be found in this, and consequently the eyes can be infected from this serous discharge and the female can be infected by such a male.

This is the "serous stage" and if treatment is begun at this time, quicker results will usually but not always be obtained; *hence the value of education of the layman along these lines.*

Most persons, however, consider that this slight discharge will right itself, but it does not, because there is *no natural immunity* of the urethra to the gonococcus great enough to overcome an infection that has already taken hold. It can only progress and get worse. Experience shows that the body defenses cannot, unaided, abort or overcome a gonorrheal infection after it has reached the serous stage; *occasionally even then,* certain germicidal drugs can work wonders.

In the majority of cases, however, the patient appears with a urethral discharge which consists of thin or thick yellow pus, is teeming with gonococci and is frightfully contagious. He complains that the urine burns, but he is not urinating much more frequently than normally, as the disease is confined to the first inch or so of the urethra.

The inconvenience is less in males that are circumcised. In the uncircumcised and especially those individuals in whom the skin cannot be retracted easily, this skin, known as the prepuce of the penis, is likely to become tender and inflamed, and require operation.

This is the picture of acute, uncomplicated, an-

terior gonorrheal urethritis, an inflammation of the first few inches of the male urethra.

It is in slang phrase called "The Clap"; and is said to be no worse than a "bad cold." It is considered to be a "trifling complaint."

It is needless to state that such an individual can spread infection to his eyes and to the eyes of others. He is not very likely to have sexual contact at this stage, on account of the pain which occurs with erection; but even this is not certain. He is a menace in a home, as bath tubs and towels may be infected by the careless and unscrupulous.

Does acute anterior gonorrheal urethritis ever get well of itself?

It does occasionally; but usually in 5 to 6 weeks, after the frank purulent discharge has ceased, there remains a small amount of discharge, a mere stickiness at the tip of the penis. This is termed "gleet," or in France, "the military drop," and as it requires many hours to accumulate, may be present only in the mornings on rising.

The underlying reasons for this gleet will be taken up in another section. Suffice it here to state that discharges from the male penis whether thin (serous) or thicker are not normal. They originate in some uncured area in the urethra and are usually gonorrheal.

What is the outlook for acute anterior gonorrheal urethritis in the male, whether treated or not?

Will it get well spontaneously?

Is it naturally self-limited?

Unquestionably some may do so, but they are in the minority. The tendency of the inflammation to extend backward into the region of the bladder neck

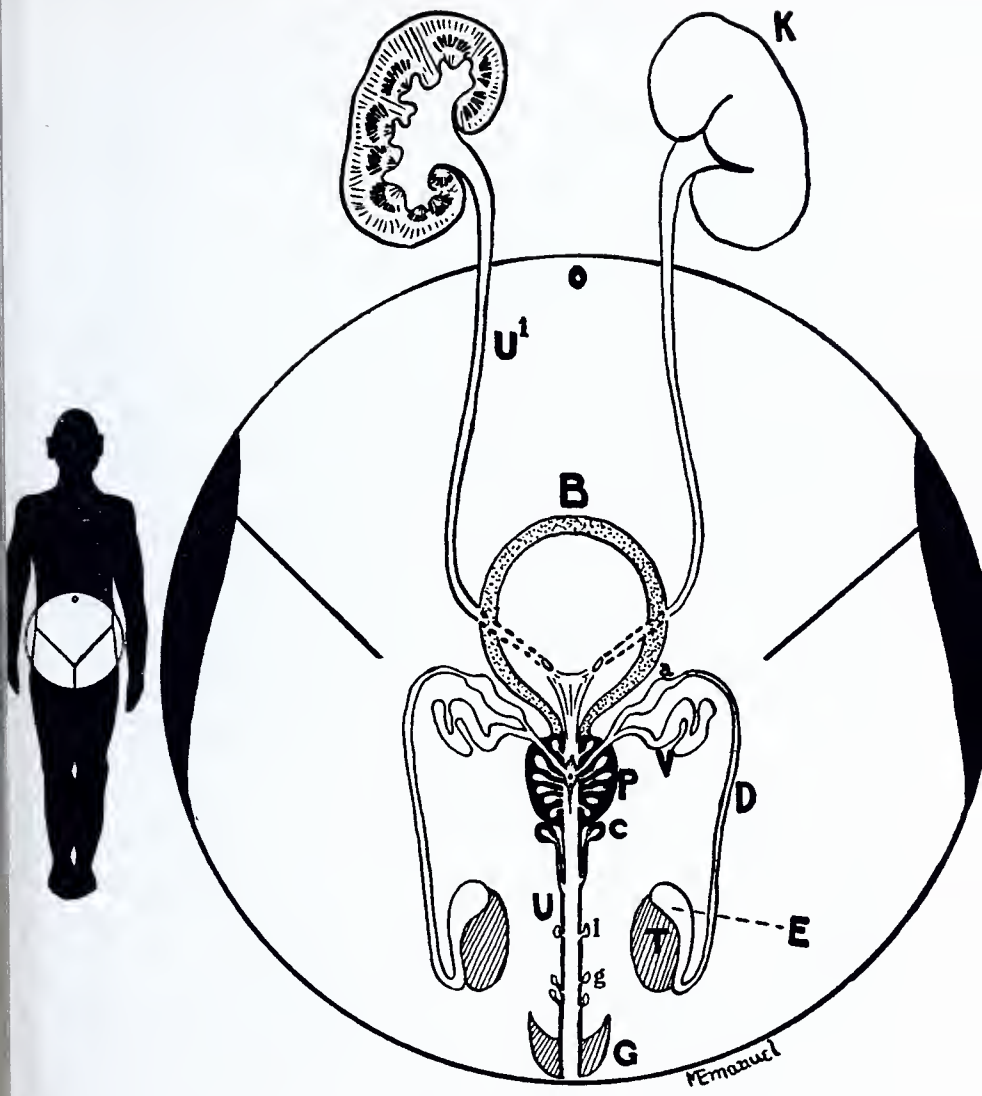
and complicate matters is too great. In most cases the infection does not remain in the first few inches of the urinary tract. Again even this portion of the tract has small irregularities in its delicate mucous lining which contain tiny crypts entered by much tinier openings. These have a tendency to harbor the germs and are a menace, whether they remain open or sealed up. The infection may remain in these for years, giving very little discharge but difficult to eradicate.

What is complicated gonorrhea?

Any gonorrheal urethritis that is not eradicated within 6 to 8 weeks is as a rule already complicated. If the disease passes backward to the neck of the male bladder many structures are encountered, into which the germs can creep and hide, and the advent of this *is not announced by a great increase of distressing symptoms.* Strange to say it may be just the opposite; the discharge may even diminish and, aside from possibly a slight or moderate increase in the number of times urine is passed, the individual may feel that he is improving. He is living in a fool's paradise.

Generally the invasion of the structures of the neck of the bladder is ushered in by not only a diminution in the amount of discharge of pus, but a *marked urgency* and frequency of urination with increased pain. He feels pretty ill. This means as a rule the beginning of involvement of glands at the bladder neck, the prostate gland and often the seminal vesicles.

The prostate is a sponge-like gland, the size of a large chestnut, which encircles the neck of the



DIAGRAMMATIC ANATOMY OF THE MALE GENERATIVE AND URINARY ORGANS

K Kidney
U¹ Ureter conducting the urine from the kidney to the bladder
B Bladder
G Glans (head) of the penis
U Urethra
g and l Glands and lacunae of the urethra (see Crypts)
C Cowper's glands and ducts
P Prostate gland
T Testicle with its epididymis (E) conducting the semen by way of the vas deferens
D Vas deferens

(See glossary for definition and description of terms, if necessary)

bladder and its continuation, the urethral canal; it has many openings into the urethra and is easily infected by the gonococcus and many other germs.

The seminal vesicles are located just behind and closely attached to the prostate and each has a slender duct or tube that, passing through the prostate, empties the contents of the vesicle from time to time into the urethral canal. The vesicle is a somewhat coiled or twisted tube like the appendix; it has many cavities and is easily infected by germs that may be in the urethral canal near the opening of its duct and is a harborer of infection par excellence.

Joining the beginning of the duct of the seminal vesicle at an angle is a tiny whitish tube, the vas deferens, which comes from the testicle, an organ which lies in the sac at the base of the male genital organs. The vas proceeds upward and penetrating the wall of the abdomen in the region of the groin, curves downward and joins the duct of the vesicle. The function of this duct is to carry the semen, a fluid which contains the procreative germ of life, the spermatozoon, and discharge it during coitus into the urethral canal, mixed with the secretions of the prostate and vesicles. The spermatozoon fertilizes the Graafian follicles (the eggs) of the ovary of the female and makes reproduction possible.

It is easy to see how the germ-laden gonorrheal pus in the urethra and bladder neck, which region contains the openings of ducts which lead into these complicated structures, can infect some or all of them. The wonder is that *all of them are not always simultaneously involved,* but this does not seem to occur regularly. However, the prostate and often the vesicles are involved in practically every case of

posterior gonorrhea. One or both testicles may be involved with great swelling and tenderness, pain and some fever and when this occurs we refer to it as epididymitis (inflammation of the epididymis), because it involves chiefly one portion of the testicles, namely the epididymis. When the testicle is involved the seminal vesicle of that side and the prostate gland are practically always involved.

In addition to this there are two glands, the glands of Cowper, which are located in the perineum, a region lying between the rectal opening and the scrotal sac; this region is pressed upon markedly during bicycling or horseback riding, and even irritated by prolonged automobile driving. These glands also empty by ducts on the floor of the urethral canal and are susceptible to infection by the gonococcus, but not often involved.

Infection of the male with gonorrhea begins as an *infection of the urethra,* a portion of the urinary tract through which the semen is ejected at the end of coitus. But on account of the fact that the various anatomical organs that empty into the urethra are parts of the genital or procreative system, the infection very often becomes a *urogenital* matter and has a great deal to do with the problem of and causation of sterility in the male.

As the inflammation progresses backward in the urethra beyond the external sphincter of the bladder (the muscle that holds the urine in the bladder), the symptoms as a rule become more accentuated. There may be increased frequency of urination and considerable or even excruciating pain and burning with it. This is gonorrhea of the *posterior* or *prostatic urethra* and *bladder neck.*

It should already be considered to be complicated gonorrhea, even though difficult to prove at this stage, because of the genital organs that empty into this region. Certainly most, if not all, posterior gonorrhea involves the prostate gland to some extent and usually involves it markedly as well as the vesicles and the testicles.

Posterior gonorrhea is usually associated with marked discharge of pus and with pain in the perineum, and the urine in the bladder becomes cloudy with pus. The pain or dull ache in the perineum is a sign of inflammation of the *prostate gland* with which inflammation of the vesicles is usually associated. The disease is now deep-seated and difficult to cure.

It may be further complicated by the advent of an acute and excruciatingly painful swelling of one or even both testicles (epididymitis). The testicle when involved usually swells within a day or two to the size of a small pear; it becomes hot, tender and general fever (up to 104° F) ensues and the testicle may enlarge to the size of a man's fist. Such a testicle rarely breaks down into pus, but the likelihood of sterility of that organ is rather great unless surgically treated within the first few days of the swelling. The individual is of course confined to bed and loses weight. At the time of the onset of epididymitis (and vesiculitis of the same side is invariably associated with it) the urethral discharge diminishes and often stops and were it not for the testicular involvement, the patient would be living in another "fool's paradise." He feels that his gonorrhea is better; *but it is really worse,* and with deep-seated involvement of these several important organs, he is

in for a long siege of treatment, before even a specialist can give a clean bill of health. In fact he may at any moment get an acute involvement of almost any joint in the body (gonorrheal arthritis or rheumatism), the most frequent joints to be involved being the knee, the ankle, and the small joints of the arch of the foot and the toes, that is the joints that are most subject to strain in standing or walking.

Here none but the common complications will be dealt with as the aim is to outline to the layman the ordinary things that occur with gonorrhea, and to make it clear to him that they *are all due to this germ* and that its eradication is *a problem;* that the disease is not self-limited; that it goes into latent periods only to relapse and that it can cause much mortality in its victims and in their sexual mates, as well as mental distress, morbidity and invalidism in both sexes.

Diagnostic points for the layman

Excluding the eyes, gonorrhea in the male, unlike syphilis, which can inoculate its victim through *any abrasion anywhere,* can attack only the urethra at its start and is practically always ushered in with a discharge of pus which is easy to notice and *should mean abnormality to anyone.*

It cannot be overlooked except by a moron or an imbecile, but it *can be disregarded.* Its complications are far-flung and mostly deep-seated so that many of them can be *easily overlooked by both layman and by physician* and the *correlation of these various deposits and complications with the original gonorrheal urethritis is one of our objectives.*

Another objective is to make it clear to the layman

that these complicated cases, and most cases that have lasted over three months are at least moderately complicated, are not easily cured and *cannot be cured at all by self-treatment.*

What is gleet?

As these cases begin to lose their copious discharge, they settle down, if uncured, to a condition which shows only a slight drop of sticky discharge, which is usually noticed only on waking in the morning. This is known as *gleet,* or the morning drop.

This is the great stumbling block

The cases are *not cured;* the infection is simply smouldering in one of the organs mentioned, usually the prostate or the vesicles. Until it is completely routed out, there will be a tendency to relapse and in addition the discharges during coitus are very contagious to the female. Furthermore under alcoholic excesses or hard manual labor, such as occur in military service, many uncured cases relapse, develop more discharge and suddenly come down with inflammation of the testicles.

This recrudescence is popularly known as "due to a strain," but a strain is a relapse of an old uncured gonorrhea, thought to have been cured.

Another complication that may gradually develop in these incompletely cured cases is stricture of the urethral canal, an obstruction due to the development of scar tissue which interferes with the passage of urine and is a dangerous complication causing mortality.

Gonorrhea in the female

The adult female is unfortunate in this respect, that gonorrhea does not always infect the urethra. If it did, the acute symptoms of urgent, frequent and painful urination, accompanied by sticky yellowish discharge would always send them in a hurry to seek medical advice. Fortunate is the woman, if one can use that term, whose gonorrheal infection begins in the urethra.

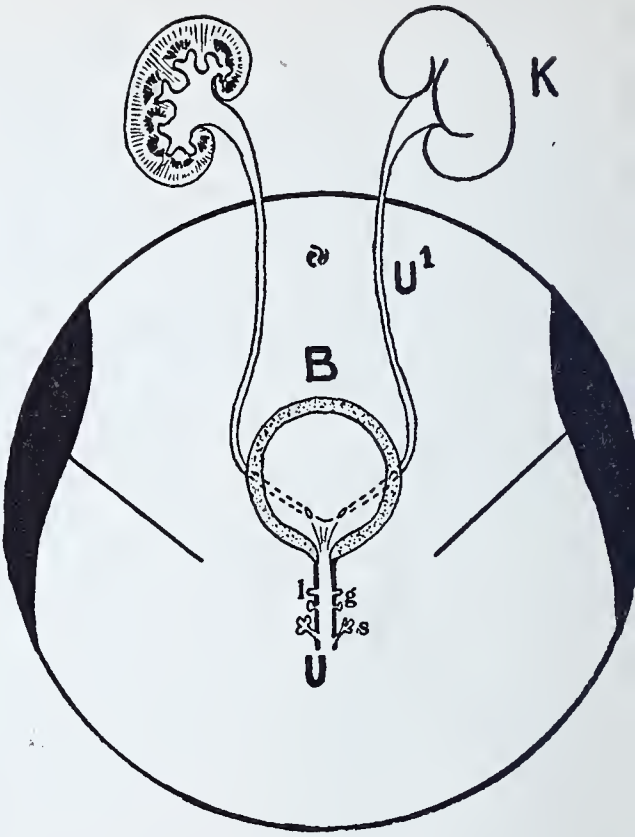
But unfortunately most of the cases begin with infection of the neck of the womb (the cervix), and unless further complicated their symptoms are not very marked, aside from increased discharge and many women are accustomed to having some discharge during the weeks between periods. So it can run along quietly, but none the less it acquires a strong foothold. In fact most of the adult female cases are like that.

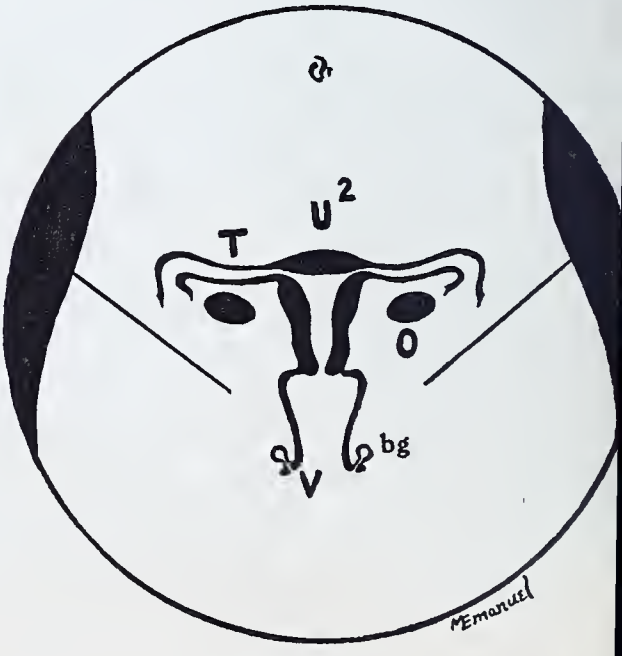
The onset of complications, and these are almost regularly encountered in the female, give pictures that *seem like many different diseases.*

Most important of all we wish to make clear that these are not separate diseases but are all part and parcel of gonorrhea.

We now give the reader an outline of the urogenital structures of the female.

Deepseated within the abdomen, behind the bladder, is the womb (uterus), which is the size of, and shaped like a pear. The stem end of the pear, the cervix, is located high up within the vagina. Its opening through which the womb discharges its contents leads into the cavity of the womb and is continued to right and left through two small tube-like





(See key on page opposite.)

structures (Fallopian tubes) which begin at the upper part of the body of the womb and extend 4-6 inches toward the ovaries. These tubes are normally the size of a small lead pencil and develop at their ovarian end a fan-like or fimbriated formation which is somewhat funnel-shaped and lies close to or embraces the ovary. The function of this fimbriated end is to receive the ovum (egg) from the ovary each month and pass it through to the womb.

This entire series of hollow structures is lined with a membrane, similar to that lining the urethra and is peculiarly susceptible to infection by the gonococcus.

Another pair of structures located at the vulva (the entrance of the female genital tract), are the glands of Bartholin; these tiny structures empty into the vulva by small ducts or tubes and are frequently infected in gonorrhea.

So we have in the female a complicated group of organs, which vie with the prostate and vesicles in the male in offering a wide expanse for inoculation.

While infection of the cervix is as a rule quiet, infection of the womb and tubes is ushered in by fever and pain localizing on one or the other side of the lower part of the abdomen. If on the right side the differentiation from appendicitis may cause some

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DIAGRAMMATIC ANATOMY OF THE FEMALE GENERATIVE AND URINARY ORGANS

S Skene's glands and ducts at the tip of the urethra
bg Bartholin's glands emptying at V
V Vulvo-vaginal outlet.
U^2 Uterus (or womb)
T Tubes (Fallopian)
O Ovary

(See glossary for definition and description of terms, if necessary)

difficulty. As inflammation of the tube (salpingitis) or ovary progresses, the tube may become sealed at both ends and form a sausage-like mass several inches in diameter. Death rarely occurs from such inflammation as most of these pus-tubes resolve somewhat, but the woman may be confined to bed for weeks or more and even may become invalided due to chronic pain and disability. In the acute stage, when the inflammation is right sided, one should be very chary about opening the abdomen for appendicitis, especially in a newly-wed. Also the girl who has strayed, and develops such an attack, may rue the day that she *withheld this confidential information* from the surgeon, who is often called in consultation, as the lack of such confession may lead him to an incorrect decision and he may open the abdomen, when this should not be done.

What is the outlook?

Most of these gonorrheal inflammations of the tubes and ovaries (the adnexa) gradually resolve with rest in bed and without radical treatment but the tubes are never again the same. If they resolve there is a tendency for the tubes to shrink and become twisted. The channel through it, if not obliterated, may be obstructed and the fertilized ovum (egg) may be stopped in its journey to the womb and may grow within the damaged tube, a pregnancy outside the womb (ectopic gestation); and as the ovum grows, a rupture of the tube may occur with acute hemorrhage into the abdomen and death, unless an abdominal operation is done as an emergency case.

But aside from this, tubes that have been so damaged usually cause sterility and invalidism and

require major abdominal surgical procedures, with a certain percentage of mortality.

Such tubes and ovaries either resolve and decrease to almost the normal size or the tubes become sealed at both ends and form a twisted sausage-like mass often several inches in diameter in their largest part, filled with thick yellow pus, which may contain and harbor gonococci for years. These tubes may occasionally discharge pus into the womb, or more often from time to time may leak at the ovarian end and repeatedly re-infect the pelvic peritoneum (the membrane that lines the lower part of the abdominal cavity), causing attacks of peritonitis with fever, pain and long sojourns in bed. This is that old "Female Complaint" that mothers of the Victorian period were told by their mothers was apparently a necessary part of married life, another of the visitations and drudgeries that one has to "bear with a grin," whether one has children or not.

What is the result of all this?

Usually most of these cases have involvement of both tubes.

Gonorrhea, the great sterilizer, seals up the ends of the tubes and these can only rarely be opened by insufflation methods or by surgery. Sterility and lack of offspring is the result. One of the most peculiar of the types of sterility produced by gonorrhea is "one-child sterility." The gonorrheic woman becomes pregnant. She is fortunate enough to carry the child to term, without miscarriage in spite of flare-up of inflammation of the tubes. She goes through labor and under the influence of this, there is another flare-up and this results in complete sealing of both tubes and resultant sterility.

Nearly all cases of "one-child sterility" are due to gonorrheal inflammation of the tubes.

What is the further outlook?

These female victims do not harbor these pus-tubes with impunity. They have relapses of pain and fever and invalidism occurs and they finally end upon the operating table, after which the curtain falls on the possibility of having children and it is often necessary to unsex them and bring on an early change of life. Many of these women are frustrated and rendered permanently misanthropic and develop complexes, which lead them to the consultation room of the psychiatrist.

Aside from suicides the mortality of gonorrhea is raised by the fact that 30-50% *of all abdominal operations on women* are the result of gonorrheal complications of the adnexa and all abdominal surgery *has some mortality.*

Are they cured of gonorrhea by these abdominal operations? Yes, for the most part, but there are small hiding places in glands located in the lining of the neck of the womb and it is often necessary to destroy this lining either by means of the cautery or remove it surgically.

What about the ducts and the glands of Bartholin? These are frequently infected and are often the only complication of acute gonorrhea in the female when only the cervix or the urethra or both are infected and when the gonococcus-laden discharge is copious. The germs enter the tiny ducts on either side of the vaginal entrance and soon the tiny glands develop pus within them, which increases in amount

until the masses may reach the size of a plum. They are tense, red and excruciatingly tender. They require surgical removal. Those that do not seal up and become abscesses are the worst of all, as they resolve but do not become cured and small amounts of pus are squeezed out from time to time, and the individual becomes a constant menace as a gonococcus-carrier.

The same thing may be said of the cases in the female that develop inflammation of the urethra and bladder.

As these improve and quiet down, they are often left with infection of the glands of Skene, two tiny glands that open by very minute ducts just within the very tip of the urethral canal. Slight pressure will reveal a tiny drop of pus which contains gonococci.

These are most difficult to eradicate and if uncured these individuals become gonococcus-carriers.

The cervix itself is *the worst offender of the three,* as there is always a slight mucoid discharge from its glands, and these glands can be harborers of gonococci.

These last three strongholds are among the main causes of the gonococcus-carrier. The patient can do nothing for herself about this. They require expert diagnosis and treatment.

The stumbling block in female gonorrhea is that all women have *some discharge between the periods.* Unlike men, a discharge does not cause them to feel that anything is wrong, unless it becomes more copious than usual, more irritating or associated with other painful and disagreeable symptoms. A man can examine himself to a certain extent, but when

gonorrhea first attacks a woman, *she cannot examine herself.* Our purpose is to put her on her guard, and to make it clear to her that the various symptoms that arise in the abdomen and elsewhere are not the indications of *different diseases* but are due to the involvement of various parts of the urinary and genital tracts. They are all due to gonococcus; they are all part of the same thing, gonorrhea that "Trivial Complaint."

CHAPTER 4

IS GONORRHEA ALWAYS CONTRACTED VENEREALLY?

Most cases of gonorrhea are contracted venereally.

But in as much as the germ dies easily when outside of the human body and is harbored and stubbornly retained in the genital and urinary tracts, it is necessary to take up the question of whether or not infection of the genital tract ever occurs accidentally in a manner outside of coitus.

The gonococcus outside of the human body does not stand light, chilling temperatures, soap and water. Pus from an acute case might be shed on a toilet seat and it is remotely possible that very shortly afterward a female adult or especially a child might become infected, but we cannot say the same for a male.

The fingers and instruments of reputable physicians could hardly be accused, as they should be sterilized before use.

Dentists could not infect a mouth, as gonorrhea does not infect this type of membrane and the same could be said of barbers, as the germ does not infect wounds of the skin; however barbers do wash the faces of customers and the eyes are susceptible to gonorrheal infection.

No Health Department need bother about food handlers who have gonorrhea.

Bath tubs, wash rags, towels and clothing in the

home may be danger points, as the eyes of an innocent may be infected.

The vaginal infection of little girls is traced almost entirely to adults. These infants and small children get the infection while sleeping with infected adults or from nurse-maids or attendants, who care for them. It is therefore found in all strata of society, and is one of the most stubborn types to treat and cure. From this it is seen that the infection of others in a non-venereal manner is not numerically a matter of great concern.

(For further discussion of this see: Book III, Chap. 2A.)

CHAPTER 5

THE LABORATORY AND GONORRHEA

The germ of gonorrhea, the gonococcus, can be found *by means of the microscope* in the infected secretions of patients who are carriers, sometimes easily, and sometimes with great difficulty.

The gonococcus as a rule has a typical shape, occurring in pairs, like two coffee-beans with their flat sides apposed. It has a typical staining reaction (known as being negative to Gram's stain), and is usually found within the white or pus cells of the secretion of the organ that harbors it.

It is similar in form and staining reaction to two other germs (cocci) namely the meningococcus (the germ causing spinal meningitis), and the micrococcus catarrhalis, but neither of these are found in discharge from organs that can be involved in gonorrhea.

In the laboratory it can be grown in the incubator with some difficulty on artificial bacterial foods (culture media) and has recognized characteristics on cultivation.

Where is the gonococcus found in the human?

For practical clinical purposes, the diagnosis of gonorrhea is best made by examining the secretions, usually purulent (containing pus), obtained and

spread on glass slides. These spreads are dried and can be kept indefinitely. They can even be sent by mail to the laboratory and a diagnosis made by staining them and examining them under the microscope.

For practical purposes it should be stated that in seeking a diagnosis of gonorrhea the secretions usually examined are those of the *urethra and the cervix* and the gonococci are usually there in large numbers; also of *the prostate,* and also the secretions of the *seminal vesicle,* but here they are very few in number as a rule and consequently difficult to find by microscopic examination. They may be overlooked on a single examination, but in such cases they may often be found in the urine passed after massage of the prostate and vesicles.

In the vaginitis of small girls they are usually present in large numbers.

Cultures of secretions suspected of containing gonococci may be made, but they are time consuming and expensive, and may often be contaminated with other germs. (See Book III, Chap. 2C).

The blood serum test for gonorrhea

This test was originated by McNeil about 1911, five years after the Wassermann test and was devised along similar lines.

It does not become positive until some weeks after the onset of the gonorrheal attack and is more likely to become positive after complications have set in, and these need not be very fulminating, as for example some cases of involvement of the posterior urethra, the prostate, the vesicle or the tubes and ovaries.

It takes a couple of months after the patient is cured for this material (Reagin or amboceptor) to disappear from the blood.

The positivity of the test, as in the case of the Wassermann test in tertiary latent syphilis, does not indicate the organ involved but indicates the presence of active gonococci in the body.

In the opinion of the author, who was among the early workers in this test in 1912 and 1913, it is of value in giving a clean bill of health before marriage. Its positivity usually means a gonococcus-carrier.

In the last few years the antigens, the important materials used in this test, have been greatly improved by research.

It should not be forgotten that the injection into the patient of certain vaccines and extracts used by physicians in the treatment of gonorrhea will of themselves produce this reaction in the blood and the substances thus produced take the usual time to disappear.

The microscopic diagnosis of gonorrhea

The diagnosis of gonorrhea is easy in acute cases in which the pus can be easily obtained without mixture of other secretions. In such instances the germs are easily found in fairly large numbers and they are usually found within the white cells (leucocytes); this is referred to as phagocytosis, as this germ has a penchant for calling forth these white cells which destroy the germs and are at the same time themselves destroyed and thus pus is produced.

Gonococci are found in fair or large numbers in other regions which are not so easy of access to the general practitioner, namely:

In the urethra of females.

In the secretions from Bartholin's and Skene's glands in the female.

In the secretions obtained from the glands of Littre and of Cooper (lacunae magnae) of the male urethra. This often requires the use of special instruments (urethrascopes).

But gonococci are often overlooked as they occur in very small numbers and are mixed with other germs in secretions of certain organs, which are easy to obtain, and this is rather unfortunate. I refer to vaginal discharges in the adult female, often termed leucorrhea; to gleety discharges (morning-drop) and specimens obtained by massage of the prostate and vesicles in the adult male. The germs here are at times few in number on account of the mildness of the inflammation in the organs. The same may be said of the cervix of the adult female.

The proof of cure

The mere cessation of the discharge in the male does not mean cure. The presence of *"gleet"* should always arouse suspicion.

In the male, proof of cure begins after cessation of the discharge with repeated examination of the prostate and vesicular secretions.

As long as these secretions contain too many pus cells and deviate otherwise from the normal microscopically, they are under suspicion.

Also in the male special instruments for visually examining the inside of the urethra, as well as the bladder neck and the bladder must be called into use in order to destroy the follicles and crypts, the

last hiding place of the gonococci, and to bring out material for microscopic examination.

To combat gonorrhea satisfactorily at this stage the physician must be a specialist armed with urethrascope and microscope and must use both without stint. Only after repeated examinations and tests, and an absence of discharge for months can the suspect be given a clean bill of health and I have a high regard also for the negativity of the blood test, the Blood Serum Complement Fixation Test for gonorrhea.

Strictures in the urethra, especially in the male must be sounded and stretched, as the irregular places in the lining membrane of the canal may harbor gonococci and, should the prostato-vesicular secretion be the basis of the occasional relapse of discharge, minor operations on the prostate and the vesicles are necessary. These are particularly necessitated in cases that have been complicated by inflammation of the testicle (epididymitis). In fact the proof of cure is inextricably bound up with correct special instrumental and often surgical treatment of the case. Is it any wonder that mass-treatment can not be applied by general practitioners to males with gonorrhea? These cases require very individual treatment and ceaseless care and unlimited laboratory facilities.

In the female there are other features which make cure and proof of cure still more difficult. The hiding places of the gonococci in the cervix, the glands of Skene and of Bartholin, require repeated tests. Often massage of the urethra will yield gonococci and urethrascopy may show from which part of the urethra the germs come.

A cervix, persistently a harborer of gonococci may

require operation, with excision of the lining or its destruction by cautery and repeated searches for gonococci thereafter.

The tubes and ovaries (adnexa) offer a great problem. If masses are present they may be sealed up permanently, or if they occasionally open they may re-infect the uterine discharges. As a rule, if sealed, they remain sealed as pus-tubes. These pus-tubes may contain active live gonococci for many years. The microscope can not find these germs but the blood may give a positive reaction.

As carriers, these unfortunates are not as dangerous to the male as those that have a deep-seated infection of the lining of the cervical canal. But they are practically incurable without a major abdominal operation and complete removal.

So the problem of the assurance or proof of cure in the female is very difficult, and it could be greatly simplified, if we could employ animal inoculation, as in the case of suspected tuberculous discharges or fluids. But the gonococcus will not infect laboratory animals.

The recurrence of the menstrual period is a great help. Just after a period, the secretions should be carefully examined for gonococci and this should be repeated a number of times.

A curious situation occurs in the case of gonorrhea in married couples, who are both apparently well. There may be no evidence of gonorrhea in the woman on examination and even on a microscopic test. Yet if she strays, another male may acquire a very acute gonorrhea from her. The woman is gonorrheic but the couple have acquired an immunity to *that particular strain* of gonococcus, and there are

many *strains*. The tissues of the male interloper are susceptible; to his sorrow he takes the place of a laboratory animal.

The same thing may occur in widows or divorcees, who did not suspect that they had gonorrhea or who thought they had been cured for years.

Is there a special drug for gonorrheal infections?

So far sera and vaccines have been helpful but not entirely curative. Recently a drug, sulfanilamide, of proven value in streptococcal infections, was tried in acute gonorrhea because of its value in sterilizing the urine of patients infected with other germs (like the colon bacillus).

Some remarkably quick and dramatic cures were obtained. There were however many relapses and many complete failures. The drug looks promising but will require further study as it may be a great help in conjunction with other treatment, even if not dramatically curative.

If indiscriminately sold by the druggist to the layman over the counter much harm may result as it is a dangerous drug, if not controlled by the physician. Worst of all, it is known that if germs are contacted by certain drugs and are not killed by them, they become very hardened and resist eradication.

This has been shown in cases of syphilis, in which inadequate treatment by arsphenamine has been administered.

We are rather sanguine in regard to the specific chemotherapy of gonorrhea. Another new drug of promise has appeared.

It should be remembered that this is a very new subject, hardly two years old and that in the case of the treatment of syphilis with arsphenamine, the entire method had to be changed in the first few years and was much modified in the quarter century that followed up to the present day.

It is our opinion that before a specific chemotherapy of gonorrhea is reached, its rationale will have to be based firmly upon certain laboratory evidence during the course of the treatment and not merely on clinical observation.

CHAPTER 6

THE MORBIDITY OF GONORRHEA

By morbidity we mean any inconvenience caused by a disease which is less than actual mortality.

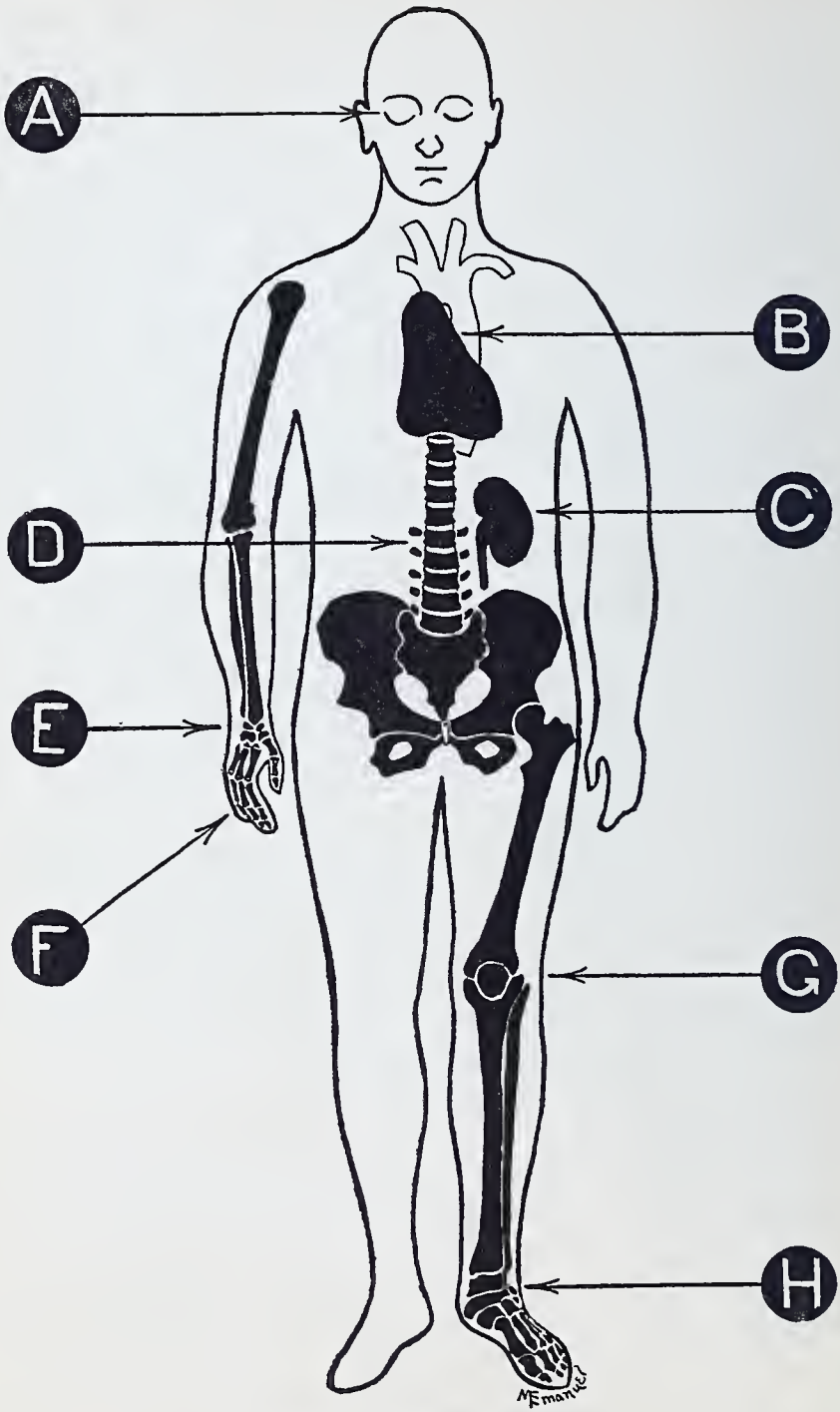
As a cause of diminution of efficiency in the worker, gonorrhea ranks very high. The incidence of gonorrhea is probably three to four times that of syphilis, so that, if we grant five per cent to the latter, then probably twenty per cent of the population, an army of twenty-seven million, harbor gonococci. Perhaps half of the male population have been infected at some time or other.

Many a working day is ruined for gonorrheal sufferers of both sexes. Especially so is this the case when the testicle or the tube and ovary is involved.

But the acute stages of these complications resolve and rarely does gonorrhea cause great loss of working time due to these complications.

The occurrence of joint involvements is quite another matter.

The joints most frequently attacked during the acute stage of gonorrhea are those involved in walking and standing (knee, toes, ankle, the small joints of the foot); it may require weeks or months for the worker to resume his occupation. The knee may become permanently stiffened, partially or completely, with disastrous results.



(See key on page opposite.)

But the worst cases of all are the cases of multiple involvement of the spinal vertebrae. These cases are associated or caused by chronic inflammation of the prostate and the seminal vesicles. They rarely occur *until years after involvement* of these organs and may be due in some measure to poisons elaborated by other germs that have entrenched themselves in the vesicles along with the gonococci or have followed them. These stiffened spines are often associated with general involvement of many other joints (fingers, wrists, elbows, shoulders). The condition is known by the term rheumatoid arthritis, or arthritis deformans. They occur more often in males. They are practically *irremediable, causing permanent invalidism.*

Not the least factor in the morbidity of gonorrhea is the fact that these sufferers, particularly the males, continue so long with their gleety discharge, which often resists non-operative treatment, that the patient becomes very morose and disconcerted and drifts from physician to physician. Most of them are in young conscientious men, who are looking forward to complete cure on account of a desire for or an impending matrimony.

THE REMOTE COMPLICATIONS OF GONORRHEA

A Blindness due to gonorrheal ophthalmia
B Heart disease (bacterial endocarditis)
C Kidney inflammation

Gonorrheal inflammation of joints (rheumatism)

D of the spinal vertebrae
E of wrist and hand
F of the fingers
G of the knee (most common of all)
H of the ankle and foot (very common)

In our experience nothing short of operative measures can cure some of these cases in the male,

INVOLVEMENT OF THE JOINTS BY GONORRHEA

and certainly it is agreed upon that surgery is the only recourse in the female.

The resultant sterility in both sexes causes more than average mental anguish.

CHAPTER 7

THE SURGERY AND MORTALITY OF GONORRHEA

In a full blown case of syphilis in the second stage we are dealing with a general infection of the entire body, in which the spirochaetes work actively for a time and then shortly afterward "dig in" and settle down to a long sleep. During this sort of hibernation which lasts for a year or so or even for 25 years or so, there is a certain amount of activity in different parts of the body. The germs begin to evince a sort of selective activity on different tissues, organs or systems of the body, suggesting in a way, as is believed by some, a possibility that there are different strains of spirochaeta pallida, one of which selects for its pabulum the arteries, another the nervous system, and another prefers individual organs or systems such as the bones or joints, or the liver. Thus the germ, lying low for years or a generation, suddenly awakes from time to time to produce general effects or local effects on a single organ, and so *on it goes.* It is difficult to evaluate the power of syphilis in diminishing the span of human life. Certainly aside from its morbidity it has some power.

The life insurance companies with their commercial cautiousness believe that it has, and prefer to err on the side of conservatism. They are afraid to invest heavily in syphilitics, and believe for the

most part that "once a syphilitic, always syphilitic," because of the difficulty in getting complete records of a treatment which extends over so long a period and because of their caution in interpreting a negative blood-test as an evidence of complete and permanent cure.

Certain it is that as a messenger of death the spirochaete does not localize much in a single organ and consequently the treatment of syphilis rarely lends itself well to a surgical attack. Syphilis is a general disease and when it attacks locally it makes its own gross lesions, which even if resolved by treatment leave their own residual scars, not needing surgery to produce them.

These scars are mostly irremediable residues unless they are remediable by plastic surgery.

Gonorrhea is an entirely different matter. In most instances it is after all a disease of the urinary or of the urogenital tracts. It is a local disease and consequently in its acute stage it causes swelling and obstruction of small passages by means of which urine is voided. But of most importance, like its coconspirator syphilis, after the subsidence of its acute activity, it also settles down into a quiet and insidious hibernation, so to speak. It gradually undermines the small calibered passages in the urinary and genital organs of both sexes, which are designed to allow the excretion of urine and menstrual flow, to allow the exit of the sperm in the male, to allow the entrance of the sperm into the genital organs of the female and the resulting procreation with the development of the fetus, and finally the extrusion of this fetus as a live offspring.

During all of these processes certain problems arise

which require interventions either semi-surgical or even surgical in order to relieve obstruction.

In other words the local nature of infection with the gonococcus makes it possible to relieve obstruction and thereby completely cure it, or at least to compromise by relieving pain and allowing nature to "refinance a partially bankrupt situation."

Up to very recently there has been no chemotherapy of gonorrhea similar to that of the Salvarsan-bismuth treatment of syphilis. We are now in the midst of something similar to this since the introduction of sulfanilamide, but it is too soon to evaluate this drug and its modifications.

In the past, from the discovery of the gonococcus by Neisser (1879) to this day, the treatment has been local and although it has certainly helped to shorten its course and diminish its severity, it has not been able to limit the spread of the disease into the deeper generative and semi-generative organs in both sexes. Nor has it been able adequately to attack these deposits rapidly enough to prevent marked distortion, and dysfunction and even destruction of these organs, so that complicated gonorrhea, unlike syphilis, has become a surgical problem, in many instances if complete cure is to be attained.

Such a situation is rather interesting and peculiar in a number of ways:

First, it has taken a long time to convince the medical practitioner that much of the treatment of the complications of gonorrhea is a surgical matter and *demands* early surgical attack, because so many of the cases gravitate or simmer down into latency. The surgeon knows however that complete cure of these latent gonorrheics cannot be hoped for with-

out surgery, and if not operated upon they remain a menace to themselves and to their mates. Much of this conservatism on the part of the general practitioner is due to the fact that he does not appreciate the value of the gonorrheal test upon the blood serum in determining cure. Also he has been taught a false doctrine or half truth by some of the high priests of the urological specialty, namely that gonorrhea is a self-limited disease and that the gonococcus can not exist in the live state in the human body longer than about *eighteen months.*

This half-baked opinion announced some years ago has been almost as detrimental to the understanding of gonorrhea as the unfortunate false deductions of Hunter in the 18th century, that gonorrhea and syphilis were one disease and were merely different manifestations of the same inciting agent.

The reversal of such an idea has been brought about by modern careful and advanced methods of cultivation of the gonococcus from female organs excised surgically and by the study of the blood serum by means of the complement fixation test for the gonococcus.

While I have purposely refrained from entering into the treatment of syphilis in the chapters that follow for valid reasons, it seems advisable to take the opposite idea in the case of gonorrhea and at least outline the surgical methods that it becomes necessary to introduce to meet emergencies, and finally to produce complete cure in complicated cases.

In order properly to discuss this subject it will be necessary to outline briefly and simply the routes of spread of gonorrhea and the results that make surgery necessary or advisable.

At the same time there will be an attempt to indicate the treatment of each complication or group of complications, so as to simplify its description for the layman.

In a preceding chapter (Book I, Chap. 3) there has been an outline of the anatomical paths of spread and some of the complications of gonorrhea in both male and female but there is no advantage in making this an exhaustive treatise on gonorrhea.

So the following will merely continue along the lines of this exposition of the changes in the organs that occur, adding perhaps a few more items of importance, as it goes into the non-urgent and urgent surgery of these complications in both sexes.

The urethra and gonorrhea

During the acute stage of male urethral gonorrhea, as long as the inflammation does not extend back to the neck of the bladder (anterior urethritis), there may be pain on the passage of urine and painful erections but no urgent complications occur that demand instrumental intervention. However, should the inflammation extend back into the bladder-neck (posterior urethritis), there is usually great urgency and frequency of urination and at times the swelling inside may completely obstruct the outflow of urine (complete retention). This is not common but when it occurs it is necessary to draw off the urine with a soft rubber tube (a catheter). Usually the introduction of such an instrument once or twice relieves the situation, but in one case it was actually necessary to leave such a catheter in the bladder for days and when upon removal of the catheter retention re-

peatedly recurred, it became advisable to open the bladder above and insert a tube; after a week or so of drainage the gonorrhea abated and after withdrawal of the tube the patient recovered completely.

Acute retention of urine in acute gonorrhea practically never occurs in the female but the female *is* susceptible to inflammation of the glands of Bartholin (Bartholinitis); these glands (see page 63) fill with pus after forming masses the size of small plums on one or both sides. The condition is not curable by incision but the masses must be completely removed surgically. In the male the glands of Cowper (see page 55) are rarely inflamed.

Gonorrhea of the neck of the male bladder (the posterior or prostatic urethra), practically always affects the prostate or in addition the seminal vesicles and following the infection of these latter glands there is likely to be a quick spread of the infection to one or both testicles (epididymitis). These complications are usually very quiet in their development. An abscess may develop in the prostate gland and this rather uncommon complication is difficult of diagnosis, but when clearly made out requires a rather extensive drainage operation in the region just in front of the outlet of the rectum (the perineum).

Inflammation of the seminal vesicles in the male, although not as a rule associated with mortality, deserves special comment because of several features, namely its tendency to produce involvement of the testicles or of the joints throughout the body or to cause sterility.

In practically every gonorrhea the prostate is likely to be involved and unfortunately the symptoms of

involvement of both the prostate and vesicles *need not be very marked.*

At any moment in the course of an *acute* posterior male gonorrhea one or both testicles may become involved and this usually occurs after physical exertion such as running or dancing or after lifting heavy objects or doing manual labor. Such testicular involvements occur also in *chronic* involvements of the prostate and vesicles, the cases that "got well of themselves" or that "were told by their family Doctor that they were all right." It is astonishing to look back on the period during the Great War and recollect the great number of sailors newly recruited by the draft, who went down with swollen testicles. The 600 beds for Venereal Diseases in a Naval Hospital showed a high incidence of swollen testicles.

In the Army it was worse as the activity of trench digging and severe drilling was unusually hard on these "cured cases" of chronic prostatic and vesicular gonorrhea.

These cases do not die, but they are candidates for swollen joints and for sterility.

As has been reiterated, gonorrhea is usually a local disease but the germs *do* get into the blood stream and cause a general blood poisoning (septicemia). Such cases are fortunately extremely rare. The lining and valves of the interior of the heart become infected and the patient practically always succumbs in a few weeks.

Fortunately this is not often the case but it is quite common for the germs to locate in joints for which they seem to have a predilection, the favorite joints being those of the knee, ankle and foot, which bear most of the brunt of our activity.

It is thought by some that at least some of these cases are not infected by the actual germ, but are affected by the poisonous substances that they elaborate in the prostate and vesicles, which are absorbed into the blood. This may be so in some cases but the actual gonococci have been grown in many instances from the fluid drawn out of inflamed joints by means of syringe and needle and it seems preferable to consider that the gonococci have been transported by transient showers of germs into the blood stream and that only those that fall on favorable soil escape death at the hands of the defenses of the blood.

Such swollen joints are not fatal but they may result in partial or permanent invalidism, the latter occurring chiefly when the joints of the spine are involved.

These joints offer an orthopedic problem of the first magnitude and may prevent a young adult from following the business or profession for which he has been trained for many years.

Sterility in the male is one of the frequent results of inflammation of the testicles, prostate and vesicles. The cause is a mechanical one due to blocking of the tiny channel (the vas deferens) which beginning in the testicle conducts the seminal fluid to the floor of the prostatic urethra. The common points of blockade are *just at* the testicle and *just at* the prostatic urethra (the opening of the ejaculatory ducts on the verumontanum). An inflammation of only one testicle is no guarantee that the sufferer will not be sterile because both ejaculatory ducts may be sealed off due to inflammation of both vesicles, although only one testicle is involved.

THE TRAGEDY OF STERILITY

Inflammation of both testicles *not treated* by radical surgery is extremely likely to cause sterility.

The entire subject of the semi-surgical and radically surgical treatment of the prostate, seminal vesicles and testicles is an important matter due to the fact that it deals with the eradication of chronic infection of organs from which absorption can occur continually or intermittently with resultant anemia, neuralgias, a general run-down condition and the dreaded joint complications.

The public and even their family physicians have been pretty well convinced of the importance of eradicating infection from teeth and tonsils, but the Doctors have not yet been converted to the importance of the eradicating from the prostate and vesicles infection due to gonorrhea, "that trivial complaint."

They are no longer willing to let the teeth and tonsils cure themselves but do not mind letting a "gleet" go on and such an infection smoulder along because, *you know,* all gonorrheas get well by themselves and inflamed testicles practically never break down into pus. Everybody lives happily ever afterwards, if we forget to remember that there is such a thing as sterility and childless marriages and some of them are not so happy and further if we remember that both the urologist and the gynecologist have stopped blaming *all the sterility* on the woman.

The objective of surgery is the shortening of the course of the acute complication, epididymitis; the prevention of the obstruction of the fine tracts through which the spermatozoa pass; the eradication of infection of the prostate and seminal vesicle; and

the opening up of the vas deferens and its termination in the ejaculatory duct.

In chronic cases the ejaculatory duct can be probed with tiny flexible instruments through special urethrascopes (electrically lighted telescopic examining instruments) which are inserted into the bladder and antiseptic and radio-opaque fluids can be injected even into the seminal vesicles. These methods bid fair to supplant the surgical operation of vasostomy, devised by Belfield, in which these fluids are injected into the vesicles through a tiny incision made into the vas deferens, and incidentally X-ray pictures may be made after such injection showing that the channel to the vesicle and to the prostatic urethra is clear.

In acutely inflamed testicles we have found it most advisable to open up the sac and by multiple punctures of a portion of the testicle (the epididymis) aid the swelling in rapidly abating and so prevent, if possible, the tiny ducts from being sealed up; and at the same time the vas-injection may be done.

Much is accomplished by such radical procedure in alleviating pain, shortening the course of the illness, eradicating the infection and preventing sterility. These procedures seem the best by experience and are certainly better than the usual "laissez-faire" methods.

Should the very recently advocated chemotherapy give evidence of being as efficacious as that devised by Ehrlich for syphilis these procedures may eventually be replaced or out-moded.

Stricture of the urethra

This is an obstruction in the course of the urethra, which is due to scar-tissue laid down in the wall of this tube. The contracture may be so great, that the urethra hardly admits an instrument the size of a hairpin whereas normally catheters and examining instruments the size of an ordinary lead pencil can be easily passed. Often complete obstruction of the urinary stream results with all the harm that can ensue due to back-pressure on the kidneys and the infection of the urine with bacteria. Nearly all urethral strictures are the late results of uncured gonorrhea.

The treatment of urethral stricture is always a matter of importance and varies in its seriousness according to the shape of the twisted channel, and the lack of elasticity of the diseased tube as some of them develop iron-like resistance to stretching.

The treatment consists of a graduated and careful stretching with instruments but in severe cases requires cutting from within or an open operation. As these cases are all infected there is always danger of absorption of bacteria into the blood stream, which may result in a fatal outcome. Strictures often require stretching from time to time as long as the sufferer lives, and have a high mortality. They are quite rare in women.

Infection of the kidneys

Back pressure upon the kidneys which empty into the bladder and the tendency of the urine to become infected are responsible to a great extent for infections of the kidney, not so often in the course of

acute gonorrhea, but more often years after gonorrhea is supposed to be cured. Stricture of the urethra and other changes at the outlet of the bladder are important factors in producing back-pressure.

These kidney infections are only rarely due to the gonococcus itself but are more often due to other germs that find a damaged kidney and urinary tract an easy prey.

The treatment preferably consists in inserting instruments into the bladder and passing tiny catheters up into the diseased kidney; this is then washed out with antiseptic solutions and the procedure may have to be repeated many times. If unsuccessful the sufferer may have to undergo operation upon a kidney, often resulting in the removal of the organ and there is mortality to all capital operations.

General invasion of the blood stream with bacteria may occur with these kidney infections and the mortality of this fortunately rare condition is rather high.

CHAPTER 8

THE SURGERY OF GONORRHEA IN WOMAN

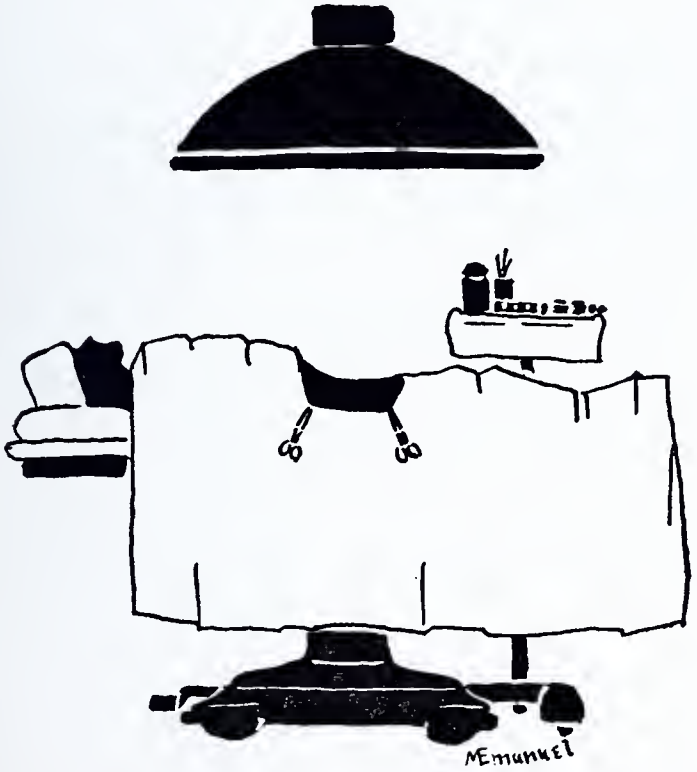
The treatment of acute inflammation of the tubes, ovaries, and womb is definitely non-surgical. The course is often long and tedious with flareups and quiet periods so that the woman becomes an uncertain factor whether her work is that of a house-wife or whether she is in the business world.

After months or years of this up and down experience, she settles down into a rather quiescent condition in which she is never up to par. Irregular periods, often floodings with anemia and attacks of pain with back ache and loss of energy as a constant companion literally undermine her stamina and drive her to the operating room. Complete removal of practically all the generative organs is an operation that has quite some mortality and a long convalescence.

Some of the patients are women already married before operation or if they marry after the operation they desire children; and if they conceive they are likely to have some trouble in labor or one-child sterility results (see Book I, Chap. 3).

Or they may not conceive and examination by special methods (tubal insufflation) shows damage to and obstruction in one or both tubes. In 25% or less of the cases under repeated treatment with this Rubin method of insufflation the tubes may open

if the inflammatory adhesions are not too firmly organized and pregnancy may later result. Otherwise there is little hope of restoring the patency of the tubal tracts between the womb and the ovary as



OPERATIONS ON WOMEN FOR "FEMALE COMPLAINT"
At least 30-50% of the abdominal operations on women have been necessitated by gonorrhea.

open plastic surgery of the tubes has not been very satisfactory.

The most desperate and dramatic of the events that may occur in many of these obstructed tubes is known as ectopic gestation or tubal pregnancy. This occurs when the ovum (egg) fertilized by the male sperm is impeded in its course from the ovary to the womb,

and being stopped continues its growth and development in the tiny tube, which is intended as a mere passage way. As the ovum develops the tube finally bursts and there is often a terrific hemorrhage into the woman's abdominal cavity, with pain, shock, and collapse. Fortunate are those in whom a quick correct diagnosis is made and an ambulance call followed by a quick abdominal surgical operation and blood transfusion may save them. But the mortality is high and much of it harks back to an old gonorrhea of the tubes with the formation of a kink or stricture.

These pregnancies in the tubes are not uncommon and fortunately in some of them the bleeding stops of itself and the patient merely has a more severely damaged tube with which to cope.

The mortality of gonorrhea and its results in the female are rather great chiefly on account of the vast number of cases that come to the operating table. It has been estimated by various gynecologists that from 30 to 50% of all the abdominal operations done on women are operations on the womb, tubes, and ovaries due to chronic inflammation of these organs, usually the result of chronic gonorrhea; and all major surgery has mortality.

Aside from this there is the possibility that in many cases the technical difficulties force the surgeon to remove all ovarian tissue and a premature menopause results with its disagreeable results.

This does not take into consideration the mental effect that ensues after such mutilating operations, which of course preclude the possibility of future pregnancy, with all the mental attitude of frustration and mental discouragement.

The lowering of the mortality of gonorrhea

The mortality of gonorrhea is bound up in and is mostly the result of its complications and their treatment.

Unless the present proposed chemotherapy proves better than it seems to be proving at present one can only hope, by careful advice and by inducing gonorrheics to take treatment further than the stage of mere temporary relief, to prevent the complications that are the basis of mortality as well as severe morbidity.

By thus obviating the necessity of operation, mortality will be automatically reduced.

ONE CHILD STERILITY

A gonorrheal woman can usually give birth but once.

BOOK II. SYPHILIS

CHAPTER 1

HISTORICAL DATA ON SYPHILIS

Historically, syphilis has been intriguingly obscure. The uncertainty of its origin has set many able investigators to searching deeply all available human documents and chronicles. Most modern authorities are inclined toward the American origin, but there is another school, who hold that syphilis existed in the Old World long before Columbus discovered America.

However, one fact is admitted by all historical students of syphilis: that the end of the 15th Century saw this complaint appear as a seething epidemic. It was an epoch-making event and numerous are the names of the scholars who turned their attention to the disease. The written records include those of Paracelsus, Ulrich von Hutton, Diaz de Isla and Fracastorius. If history can be said to be the chronicle of tragic events, it can also be said to disclose rare bits of humor, even in the story of syphilis. Few diseases have had more nicknames than syphilis. Like "Topsy" in "Uncle Tom's Cabin," it just "growed up," without known parents. As will be seen later, the rapid spread of this scourge first through Europe and later through the Far East and Africa, gave rise to names for the infirmity indicative of its most recent national host. Each nation accused the other of having given birth to the disease within its bounds.

The Italians called it the Spanish disease; the French, the Neapolitan disease; the English, the French Pocks; the Turks, the Frank disease, pointing to the European origin, while in East India, China and Japan, it is known as the Portuguese disease, since it was the latter who were foremost among explorers in the period after Columbus' voyages. Medically it was known as "Lues venerea," meaning the "Venereal Plague."

Medical commentaries and journals of the period are characteristically concerned with descriptions of the disease stressing a marked intensity of the so-called secondary symptoms, which included high fever, severe joint pains, prominent rashes, and even death.

It does not appear in such form today. Distinguished in the history of syphilis is Giroloma Fracastoro (1484-1553), a Veronese physician and poet, who in 1530 published a poem "Syphilus," this being the name of a shepherd who was afflicted with the symptoms of Lues venerea. It is not the text of the poem itself which has made Fracastorius (as he is also called) famous, but the name "syphilus," which modified to syphilis soon became the universal identification for the devastating ailment.

For any historian it is extremely easy by a study of the literature to establish the presence of the post-Columbian epidemic at the end of the 15th Century, but to ascertain a precise original source for the disease before 1493 is an entirely different matter. Did syphilis exist in Europe before Columbus, or was he responsible for its introduction there from America? As noted before, there are two groups of historical students on this question. Both accept the fact that

the European epidemic was a violent one, but the explanation that one camp offers does not accord with that of the other. It is an acknowledged medical fact that a disease previously mild may suddenly attain a virulent form. Thus, to those who believe in the theory that syphilis existed in Europe before Columbus, the epidemic was merely a lighting up of an old fire.

It is well known, however, that a disease indigenous and mild in one geographical area may assume a severe aspect when transferred to another. Followers of the post-Columbian theory therefore see in syphilis a mild malady among the inhabitants of America, that Columbus and his crew encountered. Carried to Spain, it assumed the proportions of a devastating plague. Moreover, this group points out that if the contention of the opposite school were true, there should have been previous epidemics, because sudden serious recrudescences of a mild disease occur not merely once but in cycles. They call attention to the silences of the ancient European medical writers, Hippocrates, Galen, Celsus, and Avicenna on any venereal disease, which starts as a local ulcer and is followed by constitutional symptoms, and that numerous authorities can not recognize such a disease among the ancient writings of the East or West, of Babylon or Egypt, or in the Bible.

A forceful argument in favor of the American origin is presented by the very systematic manner in which the disorder in Europe can be followed after 1493. This date is emphasized after careful elimination of ambiguous or even intentionally forged chronicles, purporting to show that syphilis prevailed in Europe in 1472 or in 1489. Among the

reliable records are those of Diaz de Isla who was in medical practice in Barcelona in 1495. His writings are concerned not only with commentary upon the origin, but upon the treatment of syphilis as well. The simple facts he states are corroborated in the works of other notable contemporaries, such as Oviedo and Las Casas. Syphilis was unknown in Europe before 1493. When Columbus and his crew landed in Haiti (Espanola) the majority of the men launched into sexual contacts with the native women and became the first carriers of syphilis to Europe. To the sailors the disease was entirely unknown. In 1493 Columbus returned to Barcelona and to Seville, bringing with him not only rich trophies and stories of a new land, but unintentional gifts as well, in the form of the insidious spirochaetes, the germs of syphilis. One source of information states that Columbus himself was infected.

The year 1494 marks the preparation of Charles VIII of France for war in Naples. His soldiers included mercenaries from Spain infected with the disease. The life incident to the advance of armies of mercenaries of that period was arranged so that pillage and debauchery had their place. Little need be left to the imagination. A fierce outbreak of syphilis ensued between February and May of 1495. By June of that year the scourge had reached France, Switzerland and Germany. In 1497 it was in England, Scotland and Greece. In 1498 Vasco da Gama carried it to India. The year 1505 found it in China.

That there is no mistake about the existence of syphilis in the New World before Columbus arrived, is indicated by Dr. Montejo and Professor Seler whose close scrutiny of details discloses that in Haiti,

Mexico, and Central America, syphilis is mentioned, described and treatment prescribed. Las Casas who sailed with Columbus on his second voyage in 1498, wrote a history of the West Indies in which he does not fail to mention syphilis as a disease to be avoided. He mentions his inquiries as to how long it was known in Haiti. When the natives were asked whether it was an old malady, he was assured that it was of great antiquity and its origin was beyond the memory of man.

One can almost be facetious in stating that syphilitic bones have been the "bone of contention." It is well to point out at this time that the likelihood of the American origin of syphilis has been based partly upon the discovery of the bones of supposed American aborigines. Famous among these bones, said to show evidence of syphilitic involvement, are those found in Tennessee and Kentucky in the United States. However, able authoritative opinion on the pathology of these bones does not permit absolute decision. First it is not fully agreed that the bones are undoubtedly syphilitic, and secondly, there is uncertainty as to the actual age of the bones. Assuming that they are syphilitic, do they belong to individuals who lived before or after Columbus came to America? Thus, while the American bones seem to be forceful evidence of the prevalence of the disease in the western hemisphere there is a doubt as to their pre-Columbian date.

What can be said about bones in the Old World? With great conviction the advocates of post-Columbian European syphilis maintain that there has not been found a single pre-Columbian bone that can be accepted as syphilitic. It would be expected that

if the complaint existed in the Old World, many such remains would have been found to confirm the belief of its ancient presence. One ardent investigator examined hundreds of remains of inhabitants of ancient Egypt and Nubia without finding a single clue to attest to the habitation of spirochaetes in men of those periods. Inspection of other bones of prehistoric and mediaeval human bodies has given similar results.

We have referred before to certain ancient writings among which is the Bible. These have been employed as evidence that syphilis must have existed in the Old World, before the time of Columbus. Countless documents have been examined by able scholars who have been confronted with grave doubts as to the accuracy of the records. Confusion of diseases by comparison of descriptions is very easy. When it is realized that until 1850 even with some knowledge of modern venerealogy, syphilis, gonorrhea, and chancroid were confused even by physicians to the extent of considering them all one disease, it is not difficult to realize that the ancient descriptions could be misleading. The skin manifestations of the so-called secondary stage of syphilis are known to mimic practically every other recognized eruption. Is one who reads a description of psoriasis, of tinea, of scabies, of tuberculosis of the skin or of leprosy, and other skin diseases not likely to be deceived, if so inclined, into the conclusion that syphilis is implied?

The Bible is frequently offered as a sound source of evidence of Eurasian syphilis in antiquity. Lepers and leprosy are mentioned scores of times. It is claimed that syphilitics could have been included

among the victims of "leprosy." In Leviticus, Chapter XIII, there is a discussion of clean and unclean leprosy. By "clean" is meant a generalized dry rash, while in "unclean" the presence of ulcerations. Both leprosy and syphilis have a generalized rash and ulcers. Syphilis is more likely to have the generalized rash. From the Bible is also derived the often quoted "The Lord will by no means clear the guilty; visiting the iniquities of the fathers upon the children and upon the children's children unto the third and fourth generations." It must however be admitted that syphilis is the only disease which was believed to be transmitted so extensively. Numerous other Biblical passages might be selected to show that syphilis is suggested. But how is one to confirm these hints or opinions?

The advocates of pre-Columbian European syphilis state that the Mosaic Law did not permit physicians to diagnose and treat cases of "leprosy," but placed these duties in the hands of the priests. The implication here is that the diagnosis was therefore too gross and what might have been syphilis was perfunctorily classified as leprosy. Further, the 10,000 leper houses of Christendom during the 13th century, it is maintained, must have included countless syphilitics in view of the fact that today leprosy is considered a rare disease in temperate zones. At the end of the 15th Century when syphilis was more easily recognized, leprosy became less manifest. True, there is logic in such reasoning, but, again, how is one to prove what may be only personal interpretations? The authorities of the opposing side, using these same sources of information, conclude that syphilis could not have been present.

The author rather leans toward the American origin of syphilis. One can only add that if the reader wishes to investigate this subject further, he has free access to a formidable array of literary works from which he may draw his own conclusions.

From the time that syphilis raged through Europe attention was naturally focused upon it. The new disease literally forced itself upon physicians. Gonorrhea, genital ulcers and other local disorders had been known since antiquity, but the sudden appearance of syphilis confused both layman and physician, particularly because of the manifestations in remote parts of the body, which followed the original sore. Nevertheless a considerable number of truths and facts were evolved. For instance, Jean Fernel insisted that a primary infection of the skin occurred before the body as a whole was infected. Colle and Musitano showed that sexual contact was not always the means of inoculation, but that kissing or the use of drinking vessels were responsible for some of the cases. Others noted that syphilis affected the nervous system and the bones. The work of Jean Astruc (1684-1766) is representative of this early accumulation of information. His writings contain the numerous views of his day upon syphilis. With some reservations one may conclude that a few years after the scourge swept Europe, physicians had a knowledge of the manner of the spread and symptomatology of the disease comparable to that of our day.

It is often found in medical history that progress in the right direction is diverted into erroneous channels by men with incorrect opinions, substantiated by the great weight of authority. Since the

days of Aristotle there has been much hero-worship. John Hunter, physician and anatomist, inoculated himself in 1767 with a discharge from an active case of gonorrhea. He produced along with gonorrhea what we now know was definitely syphilis. However, he concluded that they were manifestations of the same disease, thereby throwing the medical profession into greater confusion than ever. It was many years before physicians could unshackle themselves from this dogmatic belief.

Philippe Ricord, the French physician (1800-1889) enters the pages of medical history and puts us back on the correct path. By inoculating hundreds of humans with gonorrhea, he was able to prove and to establish forever that gonorrhea is a disease entirely distinct from syphilis. Ricord lacked only the bacteriological evidence which was acquired by the scientific world later on. It remained for Neisser in 1879 to discover the gonococcus, the actual organism that causes gonorrhea.

It was however not enough to distinguish these two diseases from each other (and also from a third), chancroid, whose causative germ was discovered by Ducrey in 1889. What was the specific cause of syphilis? What mysterious and hitherto elusive germ was transmitted from one individual to another by contacts sexual or otherwise? Pasteur was beginning to influence the scientific world. A definite germ as the specific cause of a disease became a principle. Search was therefore directed along bacteriologic lines.

Lustgarten of Vienna, a pupil of the great Robert Koch, who discovered the bacillus of tuberculosis, set out upon the trail of the microörganisms of syph-

ilis. In 1884 he encountered in his searches, a bacillus, or rod-like germ, which was present in the genital sores of syphilis. There was quite a stir in the scientific world, but like many a modern business enterprise, the great discovery turned out to be a disappointing bubble. Not long afterward, this organism was proven to be not only relatively harmless, but normally present on genitalia that received less than the requisite amount of hygienic care.

The early years of the 20th Century are undoubtedly the most important in the development of the modern knowledge of syphilis. In 1903 Metchnikoff and Roux, had their first success in transmitting syphilis to an animal other than man. By inoculating the skin of higher apes with the secretion of human syphilitic sores they reproduced the disease and this permitted many previously impossible observations upon the disease. This preceded the discovery of the real germ of syphilis by two years.

Microscopic technic was progressing also, and numerous students concentrated upon methods of demonstrating microscopic organisms by means of special stains. Bordet and Gengou, during the same year had seen a faintly staining spiral-like object in tissue removed from a syphilitic sore (chancre) but they did not follow up this line of investigation. The final step was left to Fritz Schaudin, a protozoologist and Eric Hoffmann, a specialist in diseases of the skin, to actually demonstrate the same minute slender, cork-screw-like germ swimming about in the fluid from a syphilitic sore. In 1905 they made known to the world the spirochaeta pallida, the specific cause of syphilis. Medical science now knew and saw its enemy face to face for the first time.

While the name spirochaete is commonly used even today, treponema pallidum is more scientifically correct. The first part of the name indicates that the organism is in the group of protozoa, and the second indicates its tendency to stain very poorly. If it were a deeply staining instead of a pale-staining organism, it would have been discovered before 1905.

While this chapter is not the place to discuss the form which syphilis may take during its course, we wish merely to mention that the disease in an individual is often unsuspected. Obvious changes or sores are not always present. Spirochaetes may be found in the chancre in the early stage of the disease, but not later in latent syphilis. To August von Wassermann and his assistants, Neisser and Bruck, belongs the scientific glory of the discovery of the test which has since been called the "Wassermann Test," and provides a means of detecting syphilis by examination of the body fluids, like the blood or spinal fluid. It was in the year 1906 that a small, inconspicuous medical article appeared describing the test. It was not perfect and has since been subjected to many changes, but today it is the key-stone of the accurate diagnosis of syphilis, though we must add the reservation that it is not infallible.

Once the enemy was known there remained the discovery of a suitable weapon with which to combat it. It had already been learned that spirochaetes invaded the human body and penetrated deeply into its tissues. Paul Ehrlich sought painstakingly for a specific chemical which would kill the spirochaetes on contact, but would not harm the human tissues in which it lodged. He was, like many a physician of the early period of European syphilis, aware that

mercury, which was found to be of some benefit in the cure of the disease, damaged the patient at times, as well as the disease. After 605 consecutive experimental attempts he arrived at a chemical combination "606," a number indicating the experiment in which he arrived nearest to his goal. Salvarsan, as this arsenic containing compound was called, could kill the spirochaete but spare the host. Arsphenamine or arsenobenzol (which are synonyms for Salvarsan), did not fulfill all the expectations of Ehrlich, but it has become a pivot point for a rational approach to the problem of the systematic treatment of syphilis.

There is no need to praise in flowery phrases the many men who devoted their energies and years to the fight against syphilis. Physicians and scientists merely do their daily work, yet when this malady is fully controlled and probably wiped out, and that day need not be very far off, let us hope that the persistence of these investigators, from the earliest to our own contemporaries will not be forgotten.

CHAPTER 2

HOW THE INFECTION OF SYPHILIS IS ACQUIRED AND TRANSMITTED

In the preceding chapter the spiral germ of syphilis was described. It is important that the reader should know that this germ, unlike other germs (such as the streptococcus, the bacillus of tuberculosis, the bacillus of tetanus or lockjaw) is not ordinarily found in dust, garden earth or in other places around us with which we come in contact.

The germ is a very delicate one and for that reason must be carried by an individual who is infected with it, in order that it survive for any great length of time.

It is a highly specialized germ which ordinarily infects only the human, although by laboratory experiment it can be made to infect the higher anthropoid or man-like apes, such as the chimpanzee, but not the lower monkeys.

It produces in man a typical train of symptoms during which certain parts of the body are affected, and as these various regions, tissues and organs are attacked, a so-called "Clinical Picture" is evolved, which will be described later.

For the present suffice it to say that the various tissues of the human body may harbor the germ from time to time during the course of the disease. The body fluids, whether natural or unnatural, are to be

considered an infecting source whether or not the infecting germ has actually been demonstrated by laboratory methods, namely, visually by the microscope, or culturally by growing the germs in a laboratory incubator, or bio-chemically by various tests on the blood, abdominal fluid and spinal fluid, which give inferential or deductive evidence, as they do not actually show the germ to the examiner.

The germ, like other germs causing disease, requires warmth and fluid for its well-being, and is peculiarly susceptible to sun-light, to chilling and to drying. Fortunately for the human race, when dried thoroughly the germ rapidly dies and does not, like the germ of tuberculosis, go into spore-formation, a sort of a seed-like process, which can awaken if taken into a suitable victim.

It is well to begin the subject of the transmissibility of syphilis from one person to another with the discussion of the non-venereal types of transmission, the so-called "Syphilis of the Innocent," to which there is certainly no chance of attributing a stigma.

This brings up the question of the exact mode of transmission. Certainly syphilis cannot be transmitted by mere contact of unbroken skin, such as handshaking, or the contact with the dry and unbroken skin of another individual who may even be actively syphilitic, as for example by those examining or handling another person. There is no evidence that the germ, even if present, can penetrate the unbroken skin of another.

Syphilis can be transmitted only by inoculating the germ into the victim. Usually this germ requires the presence of an open wound (broken skin, or abraded mucous membrane, such as the mouth, rec-

tum, or outer female genital organs). There is no evidence that it can penetrate unbroken tissue surfaces. There are, however, other methods of entry to be considered.

Portals of entry of non-venereal syphilis

Open wound or abrasion of skin:

Breast and nipple of the nursing women, fingers of physicians and nurses; through kissing.

The blood stream:

through blood transfusion.

Pregnancy:

By infection of the female or the female ovum by the male spermatozoon with resultant transmission of syphilis to the mother and to the child.

Having mentioned the three chief groups of non-venereal (and for the most part innocent) methods of acquiring syphilis, it should be made clear that, including syphilis of the new born, the non-venereal type of the transmission of syphilis is an appalling percentage of the total.

But even after elimination of the great number of the newly born syphilitics, the number of those infected non-venereally, while no great percentage of the total, is a factor of more than mere academic interest.

Far be it from me to cause the reader of this book to become a syphiliphobe, but he should learn the non-venereal methods of the transmission of the disease that *are important*, so as to discount the unimportance of the academically possible modes of transmission.

Ordinarily the live and active germ is to be found in the following natural and unnatural secretions of the body:

The sputum:

The natural presence of the spirochaete in the sputum of a syphilitic is questionable, but unnaturally it is found in large numbers in the sputum of syphilitics in whom there are syphilitic patches or sores (ulcers) on the tongue, lips, insides of the cheeks, palate, tonsils, etc. While the ordinary sputum of a syphilitic may not have been proven guilty, it is entirely possible that even gum-boils, which are frequent in all persons and which develop into transient ulcers, may contain the germ in the serum (or fluid) that oozes from these abrasions.

This infection through the sputum is the basis of transmission by kissing and is the easiest and probably the most frequent of the non-venereal methods of transmission, both adults and children being prospective victims.

Knives and forks, cups and drinking glasses, particularly if chipped, might infect the innocent hand of the dishwasher, if these articles had not been immersed in very hot water.

A physician, once in my experience, developed a syphilitic infection of the eye, probably from sputum coughed into it.

Sputum shed on baggage, on automobile fenders etc., has less chance of infecting innocent hands, but it has been known to occur.

Infection by way of sputum is certainly an innocent or non-venereal type, with the possible exception of that due to unnatural practices.

Tears have never been branded as infecting agents.

Discharges from the nose might possibly contain the active germ if an ulcerating area were present there.

The female breasts and their milk:

Wet nurses are still a factor, particularly in rural regions and in the case of delicate infants, who have not had the trial of, or who have not benefited by bottle feeding. Disregarding the question of the presence of live and potent spirochaetes in human milk, we must consider the fact that the nursing woman's nipples do become abraded and cracked and the possibility of the fluid (serum) which exudes from such a wound in a syphilitic woman being infectious.

It might be mentioned here that a rule works both ways. The poor sickly infant that needs a wet nurse may be poor and sickly due to inherited syphilis and from cracks and fissures at the angles of its mouth secretion may exude that can infect the nipple of the wet nurse; or the sputum of the infant not sufficiently removed from the wet-nurse's breast may infect the wet-nurse's own infant, which she is nursing at the same time. Hence the rule should work both ways and both the wet nurse and her prospective customer should undergo complete examination.

Transfusion of blood has become a thing in such common use in serious cases, that it has become a routine that all donors of blood, whether professional or voluntary, should have physical examinations and authorized blood tests for syphilis before being accepted. Without arguing the presence of spirochaetes in the circulating blood, a history or physical findings of questionable syphilis or even a slightly positive blood reaction should eliminate the candidate as a blood donor.

The infection of those caring for syphilitics, or other patients who have no signs of syphilis, is a matter of vast importance, as physicians, nurses and attendants are infected from time to time, and it is surprising how seldom this occurs when one considers the exposures they accept daily, due to scratches on the fingers, hangnails, injuries to the hands while operating, due to needles and pointed instruments. All these rather testify to the paucity of the spirochaetes in the blood and secretions of patients who are really syphilitic. However, these innocent infections do occur, and they show the need for a routine syphilitic blood test on all hospital patients, if not a routine test upon all individuals living in the United States, instead of, or in conjunction with, routine finger-printing.

The other secretions of the body might merely be mentioned for completeness as possible sources of infection. Certainly the urine has not been proven a marked factor, although the infectiousness in certain cases, particularly new born syphilitic infants cannot be completely dismissed.

The blood and spinal fluid drawn for examination should be handled by laboratory workers with care, although I have never encountered an infection from these sources.

The question of possible transmissibility of syphilis or other venereal diseases in barber shops and beauty parlors has in my opinion been vastly overestimated. However in spite of this, while the chances of the transmission of the germs are numerically slight, yet the fact that such vast numbers of individuals pass through the hands of these workers daily, makes the percentage bow to the number of

infections. Certainly skin lesions can be transmitted and we have seen evidence of this.

The laws and regulations in regard to the sanitary care of the barber's hands and the sterilization of brushes and cutting instruments in many states are adequate, but the enforcement and the carrying out of these regulations are not entirely satisfactory.

The small cabinet formaldehyde sterilizer is in full view of the occupant of the barber chair, but I have yet to see it loaded with formaldehyde-producing tablets. It is merely a cabinet for instruments and a catch-all. The cup with the cake of soap and the community shaving brush are the rule and should disappear. We doubt that a person can be shaved without making an abrasion large enough to be a portal of entry for the spirochaete, if present. The lack of disastrous results is merely an evidence of the feeble transmissibility of the disease except by means of the secretions contaminated by the serum oozing from a syphilitic deposit.

It might be added here that infection of the genitals of either sex by objects such as clothing, toilet seats, etc., is only remotely possible.

In closing this section on non-venereal infection with the spirochaete, the aim is to make it clear that while the number of these infections is numerically small, their importance is fundamental and their need of accurate and early diagnosis is of vast importance.

Due to the failure of the patient to realize the importance of these apparently slight things, and the difficulty of diagnosis for the average physician on account of the fact that early lesions are not always typical and usual, syphilitics have not begun

their treatment early or at all and there has been untold disaster due to this delay.

No attempt is made to condone the acquisition of syphilis venereally, because of the fact that there are non-venereal cases. It is merely asked that prudery be stifled and that all cases be looked upon not as the "Wages of Sin," but as curable diseases, that should be diagnosed early and quickly treated.

Venereal syphilis

The reader has no doubt by now surmised that the larger percentage, even though not all cases, occur due to the sexual act, and consequently the greater number of cases occur, the same rule holding, by inoculation of abrasions of the surface of the sexual organs.

In the male the penis bears the brunt of this, although the skin of the adjacent scrotum, the pubes, and the groins may occasionally be the point of inoculation. In very rare instances the inside of the urethra may be infected and develop a nodule, this being the most common site of entry and development of another important sexual disease, gonorrhea, which has been discussed.

The importance of small fever blisters, herpes of the skin of the penis, cannot be over-stressed, as these lesions are very common and are like "shingles" which occur on the chest wall. Their tendency to regularly break open in a day or so and to remain unhealed for a few days, makes them an excellent point of inoculation.

The lack of circumcision in most males, and especially the presence of a foreskin, which cannot be

completely or easily retracted, renders the underlying and consequently over-tender tissues subject to abrasions. Such a hidden sac also prevents easy inspection or any inspection at all and consequently the nodule and ulcer which follows inoculation can develop unseen and even heal completely without treatment, leading the victim into a later (the secondary) stage of syphilis with its penalty of general infection of the entire body.

Infection of the female by coitus is a more complex and serious matter because of its two methods of inoculation.

The first method of inoculation is the regular infection of an abrasion. If this occurs on the outside of the genitals it may be noticed by the woman partly because of its irritation, although the early nodule, the chancre, or ulcer of syphilis, unfortunately for the victim, is not as a rule very painful and may therefore be overlooked.

On the inside, in the depth of the female genitals, the painlessness and silence of the nodule and its subsequent ulcer is tragic and may manifest itself only by a slight increase of the ordinary mucous discharge (leucorrhea), which is a rather regular thing in women and is among the better sorts controlled by douches, which with most women are as regular a sanitary procedure as tub baths. Due to the hidden position and the silence, or latency of the early lesion, the female victim usually goes on to a healing of the ulcer and a progression into the secondary stage with its penalties, and she is totally unaware, if she is promiscuous, that she is a veritable incubator of infection, a menace to any male that approaches. She is unaware that she has syphilis until some

symptom of the secondary stage, such as the rash, appears.

The second method of inoculation of the female by the male is the most tragic of all. In this type there is no open sore present on the male and he may be in the late tertiary or latent stage in which he has no apparent bodily symptoms. He may even be one of those unfortunates in whom all the early (primary and secondary) signs were overlooked by him and even by his physician, or one of those equally unfortunate who was incompletely treated and told that he was cured, so that he even married on the strength of this opinion. Such an individual, not sterile, is able to cause an infection of the ovum by means of his sperm and the result is the infection of the female, when pregnancy occurs, with either resultant miscarriage or "syphilis of the new-born."

Finally we must add that there is another type of ulcer of the genitals in both sexes, caused by the Ducrey bacillus. This ulcer resembles the syphilitic ulcer very much and is known as soft ulcer (chancre molle or chanchroid). It is not syphilitic and in its secretions the germs of syphilis cannot be found. This at times offers great difficulties in diagnosis, and the difficulties are often increased, when there is a double causative infection by the above mentioned germ as well as the spirochaete.

The differentiation can usually be made, but the aspects of this type will be better discussed in another chapter.

CHAPTER 3

WHAT SYMPTOMS SUGGEST THE POSSIBILITY OF SYPHILIS

In order to outline clearly and simply to the reader the symptoms or signs that should urge him to seek medical opinion as to diagnosis, it will be best to outline the course that a typical untreated case of syphilis can take from the inoculation to its possible final outcome. This combination of symptoms and signs is known as the "clinical picture of syphilis." It should be understood that this disease is very protean, which means that it has many and varied manifestations.

Untreated syphilis is not a local affair but is a general involvement of every tissue and fluid of the entire body. The mere fact that every part of the body does not give symptoms and signs to patient or physician, or that every body fluid does not yield bacteriological or chemical evidence to the laboratory worker, may merely mean that these tissues, organs and fluids are not yet sufficiently involved to yield evidence.

We should consider that those tissues are either mildly involved, or at least that, with the germ lying quietly like a smouldering fire, there is a likelihood of a manifestation at any time, if no treatment is being taken. Syphilis may have many types of rash but should by no means be looked upon as a disease

of the skin, which is cured when these rashes disappear.

In order to give the reader a satisfactory word-picture of the disease it is best to select an average *male adult* and systematically describe the course following infection, outlining more or less every possible result, realizing that the individual case of syphilis is like an incomplete jig-saw puzzle, as no case has all the symptoms and signs which will be shortly enumerated. However we are sailing on smooth water as far as diagnosis is concerned in the first six months of the disease because the cases run rather true to form and fewer symptoms and signs are absent, even though some of them are not marked and are therefore easily overlooked by the victim and even by the physician, who cannot or at least does not see the patient from day to day after the inoculation has occurred.

It is in the later stages that the fragments of the puzzle are unfortunately few and far between, making suspicion of the disease by the layman and diagnosis even by the physician very difficult, until more or less irreparable damage to vital organs has been done.

The inoculation

The average case in the adult male is infected during intercourse through a more or less tiny scratch on the head (glans) of the penis or its loose skin. It has already been explained that small abrasions, due to tiny pimples (herpes preputialis) are easy points of entry for the germ.

The "incubation" or first latent period

The scratch or abrasion, just like a small pox inoculation on an arm, heals over regardless of the fact that the germ is implanted there, but in a syphilitic inoculation nothing occurs as a rule for two or three weeks and I have seen this delayed to 44 days.

Stage I—The primary stage

The appearance of the chancre and its ulceration

At this time a small firm and unfortunately painless lump* the size of a pea or somewhat larger, can be felt at the site of the former scratch which the victim has forgotten or which he failed to notice several weeks before. He usually does not notice this lump at first because the skin over it is intact, but pretty soon the skin having become thinned, stretched and rubbed by the clothing, becomes slightly eroded and he *does notice the moisture*, which causes it to stick to his clothing; then if he is smart, he should go at once to a physician.** But the fluid is clear and not bloody and he usually puts on some talcum powder and allows "hope" to waste golden days during which the germ is traveling through small lymphatics (tubular channels in the

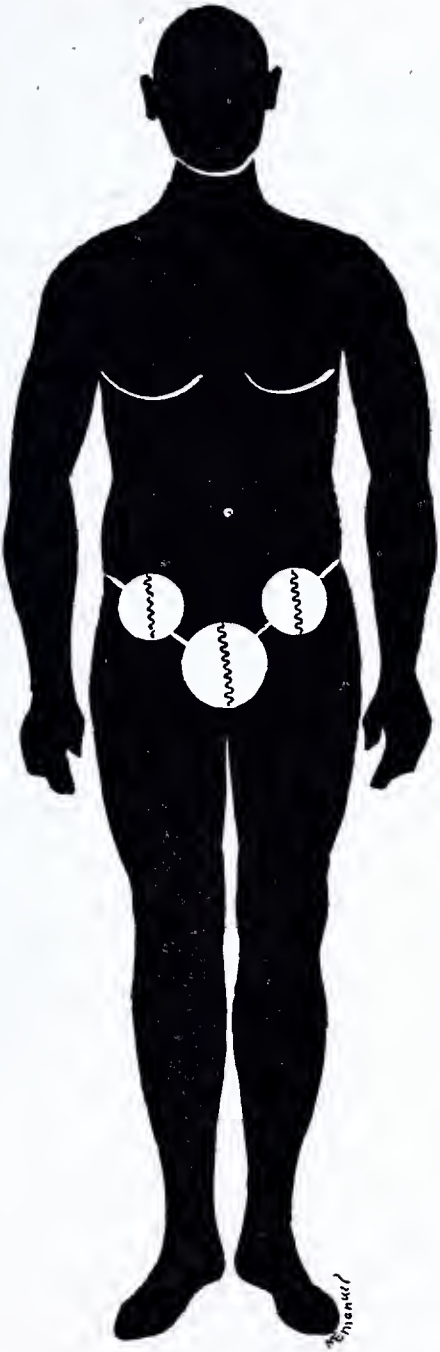
* No attempt is made here or later to describe the chancre minutely as for example its hardness, particularly if located on the glans penis, as those differentiations are for the physician. The descriptions of disease in this book are primarily for the untrained observer, the patient, or those around him.

** In the early, clean serous stage of the primary ulcer, the spirochaetes can be easily found alive by means of a microscope, preferably of a special type, known as the dark-field microscope, and the diagnosis can be made *before* the blood of the patient gives a positive chemical test for syphilis, the Wassermann test.

skin and fat leading away from the lump toward the groin or groins), where it attacks the small, hitherto unfelt lymphatic glands. These lumpy masses form the first line of defense in their attempt to prevent invasion of the entire body. Fortunate is the victim who is diagnosed and treated in this early portion of the primary stage.

But shortly the glands in the groin or groins become enlarged and these form separate, often stony-hard, rounded or somewhat irregular and unfortunately painless masses, varying from pea to cherry size, rather separate from each other, numerous, not attached to the skin over them but to the tissues underneath them. The appearance of these glands marks the *later portion of the primary stage* and means that they have, like soldiers, thrown themselves in the breach in an attempt to stop the invasion. Remembering that we are describing a *typical untreated* case, these defenses are regularly penetrated by *some of the germs and these germs travel through lymphatic channels* leading beyond this first line of defense to deeper glands situated within the abdomen. But when this occurs some of the channels miss the deeper glands, so that some of the germs enter the general blood stream and the *general invasion* is on.

From here on, the primary stage insidiously progresses, and something is occurring of which the victim cannot be aware. A fight is going on throughout the body as these germs, circulating about, either remain in the blood (although they have not been demonstrated there in man by laboratory methods) or locate temporarily, or even "dig in" permanently in the various tissues or organs (muscles, liver, spleen,



SYPHILIS—STAGE I (PRIMARY)

Note that the spirochaetal infection usually begins on the genitals, and shortly afterwards involves the lymph glands in both groins.

bones, joints, glands, brain, heart-muscle, arteries etc). While the demonstration of spirochaetes in these organs has been shown at autopsy examinations after death, yet for our description of the early or primary stage of syphilis it is most important to understand that gradually accumulating in the blood are certain *by-products* of this fight due to the reaction of the tissues, of the victim to the infecting germs.

These biologically chemical by-products can be determined by certain blood tests, notably the Wassermann test, and when they are determined the victim is pronounced *Wassermann positive.* Within a rather short time after the appearance of the chancre and its ulcer (usually 10-14 days) the blood becomes slightly positive (one plus) even before the chancre has begun to disappear and regularly before the ulcer is completely healed.

The Wassermann test detects the smoke of the conflagration; it does not demonstrate the germ of syphilis itself.

The patient is now in the later portion of the primary stage and his chances of cure have diminished somewhat. The duration and amount of treatment for the cure of such a case have necessarily increased. There is some difference of opinion as to the complete curability of cases that are *strongly Wassermann positive;* we have a very sanguine attitude toward cases of this type in Stage I.

The primary stage of syphilis marches on. As said before syphilis is *not a self-limited disease* but the "Masquerader" as syphilis has been called, heals its local sore in a few weeks and the glands in the groin lessen in size. To the patient or even the physician

the victim in this *second latent period* of the *primary stage* seems normal, but the blood reaction to the invaders is increasing to the so-called maximum or diagnostic strength (3 to 4 plus). The outward signs sleep to wake again. The most disastrous cases are those in which the chancre heals in a few days before a microscopic diagnosis has been made and in which the symptoms of the next, the (secondary) stage, are slight or evanescent. The patient may never see a physician at all and he lives over a volcano, which may erupt 20 or 30 years later.

So the primary stage, like a serpent, slinks into obscurity and often *with similar insidiousness* the next or secondary stage of syphilis is ushered in.*

The secondary stage

The chief symptoms of this stage are the rash (roseola), the sore throat, the falling out of the hair, and at times a slight fever and malaise.

* We are still retaining the terms primary, secondary, and tertiary syphilis, as they have their roots deep in the literature and the physician thinks in these terms. As a matter of fact since the Wassermann test was devised (1906) a more accurate conception would be a stage *from the inoculation to the beginning of a slightly positive blood Wassermann reaction and a stage after this.*

Such a conception would be based upon laboratory findings which are more accurate and regular than the appearance of physical signs and their notice by either victim or physician. This idea is more in line with the conception of the disease as an invasion of the entire body after the glands of the groin are passed by the spirochaete. It is of course based on the fact that the bloods of *all* cases of untreated syphilis become strongly Wassermann positive (3 to 4 plus) by the time the secondary stage signs appear, but we feel that the faint appearance of this blood reaction (one plus) should be the dividing line, as it is more practical from the standpoint of gauging the necessary amount and duration of treatment and for the outlook as to complete cure.

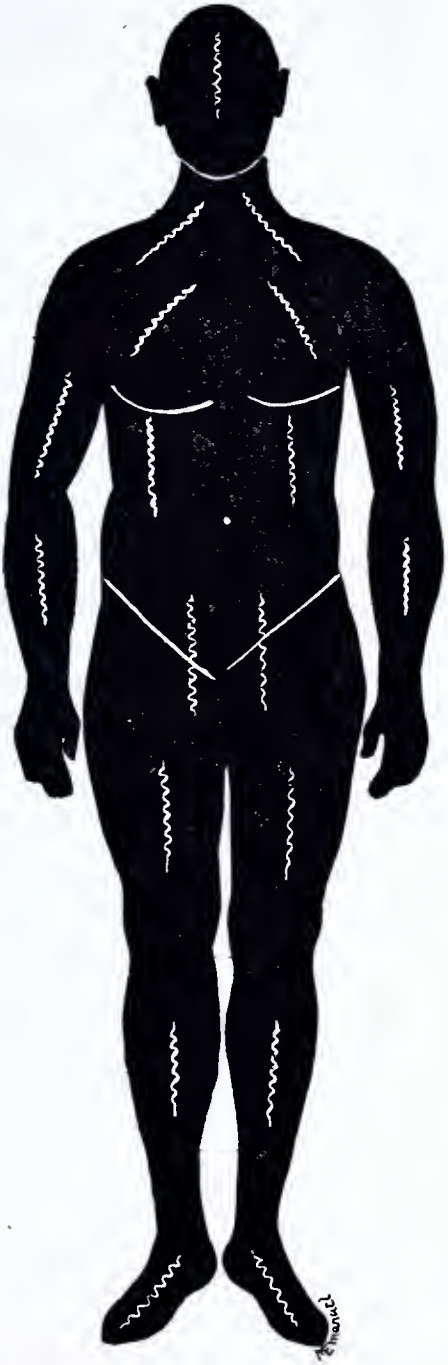
In other words from a scientific as well as a practical standpoint syphilis should be considered as having two stages: A pre-Wassermann and a post-Wassermann stage.

The date of the beginning of this stage in our victim is theoretically easy to set. It begins with the observation by either patient or physician of any of several symptoms or signs shortly to be enumerated and described. But from a practical standpoint the date of beginning is rarely noted exactly, because of the fact that the symptoms and signs of this stage of the disease are insignificant, or are hidden, and they come on slowly and insidiously without dramatic entry.

The triad of secondary symptoms

The patient may have a very slight fever and not feel badly at all. He usually has a slight uneasiness in his throat which he attributes to a "cold" with a "touch of grippe." He has in times past seen his comb loaded with hair due to dandruff and so he buys a new hair tonic. The rash itself may be slight and even overlooked and he may never consult medical aid until long after it has vanished, as unfortunately it rarely occurs on the face and if it does it is faint. It is best seen on the back of the shoulders and so in badly lighted bathrooms may be easily overlooked. So he may pass on within a few weeks into the third stage of the disease.

But the above symptoms mean that the entire system is the seat of a mighty battle between the tissues of the body and the spiral germs, which have penetrated every tissue and fluid in the body by way of the blood stream. It is a true blood invasion or bacteriemia (blood-poisoning) just like typhoid fever, and the general symptoms of fever and malaise are evidence that germs and body cells are being killed



SYPHILIS—STAGE II (SECONDARY)

Note that the spirochaetes travel in the blood stream to all parts of the body; it is a bacteriemia.

and the products of this carnage produce a reaction, with consequent symptoms and signs.

The sign most striking and dramatic to the victim is the *rash* (the roseola), if fortunately this be well developed, and *it is as a rule.* The usual rash of this period consists of very faint dull pink spots, at times copper colored. They are about the size of a baby's finger nail or somewhat larger, and are not usually raised above the skin level, but if raised they are not markedly so; the spots do not itch; they are located mostly on the back and shoulders as high as the collar line, and also on the chest and upper half of the abdomen as far down as the navel; sometimes on the upper arms and upon the thighs. The spots are usually separated but may run together. They fade and disappear without treatment in two to six weeks.

They are the signs that the victim is most likely to notice and for which he seeks medical aid. Hence the date of the beginning of the secondary stage is usually marked by the appearance of the rash. The rash rarely ulcerates, and unless ulceration occurs it *cannot transmit the germ to others by mere contact.*

The mouth and throat at this time are another story. The saliva being loaded with the deadly spirochaetes, which are added to it from the discharge that oozes from the surface of the mucous-patches, which may be few or numerous and are found on the tongue, the inner sides of the cheeks, on the soft palate, and on or near the tonsils. These patches are the rash, as it occurs on the mucous lining of the inside of the mouth, but the rose-color of the skin rash is here replaced by the *grayish coating* of the mucous-patch. These patches are not as

a rule painful and they heal of themselves in a few weeks.

The falling out of hair occurs at times rapidly and in this stage gives the head a moth-eaten appearance, unlike that occurring from dandruff.

Besides the above triad of symptoms, there are in the second stage other signs and symptoms, such as fever, aching in the bones and joints of the extremities, a general discrete enlargement of the rest of the lymph-glands all over the body (in the bend of the elbow, arm pits, neck, etc.), which are not likely to attract the victim's notice, or if so, to seem important, but they are found by the trained examiner. All of these except the enlarged glands disappear without treatment in six weeks or so.

Syphilis has now within a few months taken possession of practically every tissue and fluid in the body with the possible exception of the brain and spinal cord. This is borne out by the fact that in practically all cases the blood is now strongly Wassermann positive (4 plus) and in some cases even the spinal fluid shows certain changes, although there are rarely at this time signs of disease of the brain or spinal cord.

With the disappearance of all symptoms and signs of the secondary stage the patient, now physically apparently normal, and in the absence of laboratory tests on blood and spinal fluid able to stand a life insurance examination, passes into the tertiary stage; the third latent period of syphilis which is ordinarily known as *"The Latent Period"* until some signs appear which terminate its latency.

The tertiary stage

This period begins from the time all the secondary signs and symptoms disappear and, as has been before stressed, *this disappearance occurs* regularly even in untreated cases; unfortunately, having been entirely unaware that they were syphilitics, the victims may be first seen by the physician in this stage.

This type of syphilis may go on with no evident symptoms or signs at all to the very end of the patient's life and such a case is referred to as *latent syphilis* (lues latens). Note that the term "latent" does not mean that the disease has become spontaneously cured, or in the case of persons who have had a moderate amount of treatment, that it has become cured by that medication. It merely means *hidden*. The tissues are saturated with the germ which is insidiously working and symptoms of dysfunction (distorted function) of a tissue or organ may appear at any time and in some cases there may occur a dramatic climax such as sudden death.

Keeping in mind the fact that the primary object of this book is to call the attention of the lay reader to symptoms and signs of disease that should cause him to pause and seek expert opinion, one must agree that this third stage of syphilis is a difficult one for the layman to comprehend because of two things: First, most of the symptoms which arise are those of dysfunction of important internal organs and often the early symptoms of this dysfunction are neuralgias, attacks of slight indigestion, and other symptoms that hardly seem important to the individual and which only if repeated cause him to take cognizance of them and seek opinion.

Secondly, the surface signs, such as the skin lesions, are not so frequently present in this third stage as those of the other more important organs, but, being on the surface, they are more likely to send him to seek advice, as they do not right themselves with the application of talcum powder and cold cream.

For this reason it is probably best to outline the symptoms that may occur during this extremely long third stage, which often indicate that something is "brewing" and at the same time indicate which organs of the body are waving the *red flag,* by developing symptoms that the patient may notice.

It must be, of course, understood that on examination by a physician there may be found certain signs, such as an enlarged liver, which may account for the symptom of pain which the patient has noticed. Such a finding may make the physician certain of the diagnosis of syphilis or he may be aided by the Wassermann test if it happens to be positive.

In outlining a typical case of latent syphilis in the third stage it must be understood that there is no sequence in this list of symptoms. Any one or more of these may occur. In no case will all of them occur. As a rule certain systems of the body will be attacked to the exclusion of others. Rarely, none of the symptoms occur and the case is completely latent throughout life; such cases may be accidentally discovered by a routine Wassermann test, as is done in many of the larger hospitals to which a patient may have been admitted for some vague complaint or in which a complication may occur often after an ordinary operation and a Wassermann test may point the way to the diagnosis of an obscure case.

Many of the patients who have no definite symp-

toms or signs complain of "*generally poor health.*" It is important to call to the attention of the public that the statistics of the actuaries of the large life insurance companies indicate that syphilitics do not live as long as non-syphilitics. This has led some companies to consider all syphilitics substandard risks, even if they have been treated reasonably or very well. Some companies absolutely reject them; others rate them ahead a number of years. Few consider them standard risks.

The skin:

The layman is always suspicious of any skin rash because most of them are unsightly. In tertiary syphilis rashes may occur on any part of the skin. They are usually deep-seated and cause thickening of the skin; they are likely to be formed of small nodules which form an *almost complete circle* surrounding an open uninvolved island of skin. When they ulcerate they show little tendency to heal unless the underlying cause, syphilis, is strenuously treated. They do not usually itch nor are they apt like many skin lesions to occur symmetrically on both sides of the body (on both arms or legs, etc.). They may be limited by an irregular margin or so-called "geographical line." A favorite place for the formation of tertiary skin lesions is the upper third of the shins and when such lesions ulcerate, they heal with great difficulty leaving the usual thin tissue-paper-like scars. These gummata of the skin may also occur elsewhere.

Among the most usual locations for tertiary skin lesions in adults, especially males, are the palms. Here the thickening of the skin (keratosis) occurs

with callous formation especially among the "horny-handed sons of toil" and cracking of the skin (fissure) occurs and is very difficult to heal.

The hair:

In this stage there is possibility that the hair may suddenly begin to fall out and for no apparent reason. It often produces a moth-eaten appearance but more commonly it occurs in patches measuring several inches in diameter, the falling out of the hair (alopecia) stopping sharply at a definite margin; the skin which is denuded may appear smooth and perfectly normal. The outlook for restoration of such a patch of baldness by means of anti-syphilitic treatment is usually good, unlike that of the usual baldness of middle age.

The eyes:

The sudden or even gradual onset of a partial or more often a complete drooping of an eyelid is very dramatic. The patient is more or less a walking sign-board marked *syphilis* as this type of eye disturbance rarely occurs alone due to other causes. It is due to disturbance in function of one of the nerves (the third cranial nerve) emerging from the brain to supply, among other structures, the muscle that raises the eyelid. It rarely occurs on but one side and means syphilitic brain involvement and indicates urgent special examination and heroic treatment. Fortunately it is one of the symptoms of brain syphilis that usually, more or less rapidly, recovers. Examination at this time generally reveals irregularities in the size of the two pupils of the eye and often poor function of the iris, which indicates involvement of

other branches of this nerve and may occur without drooping or paralysis of the eyelid.

Another serious involvement of the eye is acute iritis which starts with watering of the eye and a feeling as if dust is in it. The pain and the sensitiveness to light (photophobia) that ensues means much to an alert physician and demands urgent treatment in order to prevent permanent damage to vision.

Disturbance of vision:

This is a matter that may gradually set in and the layman usually thinks it can be improved or completely corrected by putting on glasses or having a change made in the ones that he is already wearing. When due to syphilitic involvement this is not the case and such tactics without prompt accurate and complete examination by an eye specialist may by delay cause untold disaster.

Usually disturbances of the action of the pupils do not materially interfere with accurate vision. On the contrary, a weakness of one or more of the muscles that control the movements of the eye may by disturbing the balance between the two eyes give considerable trouble and at times double vision ensues.

The gradual or sudden dimming of vision (amblyopia) is one of the most serious catastrophies that befalls the syphilitic. The trouble in most of these cases is in the retina and it requires an inspection of the depths of the interior of the eye by means of an ophthalmoscope, a special optical instrument, in order to diagnose the type of involvement that is the cause of the impending blindness. It is unnecessary to remind the reader that such an opinion is urgent and should not be had from a salesman of eyeglasses

even though he may be licensed to examine by ordinary refractive methods.

These findings may be a hemorrhage involving the important portions of the retina of one eye and this may later be absorbed by treatment with restoration of vision. But permanent damage to certain nerve cells which control sight may also remain if treatment is delayed. This is a local matter. The most frequent and important type of involvement however occurs simultaneously in each retina and is due to a wasting of the entire visual nerve (optic nerve atrophy). This is a true syphilitic involvement of the optic nerves and is usually associated with syphilitic involvement of the brain or spinal cord. Even under treatment the outlook for restoration of vision is only fair. This is a fairly frequent disaster in late syphilis and it is through this complication that syphilis becomes statistically an important cause of blindness in adults. It may be the first symptom that brings the patient with (locomotor ataxia) or certain types of brain syphilis to the consulting room of the physician.

The ear:

Gradual or rapid deafness may occur in the tertiary stage of syphilis in untreated cases. It is due to involvement of the centers of hearing in the brain; the outlook is poor. Occasionally in cases under treatment by the modern arsenical drugs (like Arsphenamine) deafness may suddenly result, and naturally with great alarm to the patient. This form of deafness usually clears up if the drug, instead of being stopped is pushed vigorously. These cases usually occur in the second stage of syphilis.

The mouth and throat:

Pain in the roof of the mouth or on swallowing may be caused by a deeply punched-out ulcer of the roof of the mouth. These ulcers may occasionally spread backward involving the soft palate and cause perforation and marked destruction of a part or all of the soft palate. Such destruction can result in regurgitation of swallowed liquids or soft food into the nose. Treatment is of course urgent.

The tongue:

The upper surface of the covering of the tongue may become thickened, cracked and ulcerated and develop a "geographical margin" similar to that occurring in the lesions of the palms previously described. Until ulceration has actually occurred, the patient may not have inconvenience enough to send him to the physician for this condition.

The extremities:

In the adult involvement of the joints is not very common. When it does occur it usually takes the form known as Charcot joints as described by the famous French syphilologist. These may occur in one knee and have a long, gradual, rather painless development and are practically incurable when first seen and diagnosed. The joint becomes enlarged and the capsule is relaxed, so that the gait is very "wobbly." On examination it feels as though there is some sort of doughy material in the joint and the ends of the bones and cartilages move on each other giving the impression of a "bag of loose bones." Usually little or no fluid is found in such joints and there is found a great deal of disorganization of the

ends of the bones particularly of the cartilages. The treatment is not surgical but the joint can be made more serviceable by special braces. The condition however is incurable. Some of these cases may be associated with syphilitic involvement of the central nervous system, at times even with definite locomotor ataxia and may account for the diminished sensation in such extensively diseased bones and cartilages. The condition is even more frequently found in the elbow joint.

With syphilitic diseases of the central nervous system as an underlying cause we should mention the perforating ulcers of the ball of the foot and more usually of the big toes. These are punched-out ulcers about one half an inch in diameter. They develop slowly and painlessly due to lack of sensation in the foot. They may even penetrate to the bone and may become infected and cause blood poisoning. Nearly all of them occur in sufferers from locomotor ataxia.

The male genitals:

Enlargement of either or both testicles may occur in late syphilis. It may be lumpy and irregular due to the formation of gummata or the testicle may enlarge and be as smooth as a billiard ball and this type is usually painless and rather insensitive to pressure.

The heart and its blood vessels:

Late syphilis does not as a rule affect the valves of the heart but it commonly does wreak havoc upon the arteries that run in and supply the heart muscle itself (the coronary arteries), causing hardening of these vessels (coronary arteriosclerosis). This results in attacks of pain in the chest and down the left arm

and a fearful sense of impending death and in fact even sudden death may occur. This is known as angina pectoris and it ranks high among the causes of sudden death. At autopsy there is found hardening of these coronary arteries and degeneration of the heart muscle (myocarditis).

The walls of the aorta, the great vessel leading the blood out of the heart, weakened by syphilitic inflammation may swell out like an over inflated pneumatic tire forming a hollow mass known as an aneurism and this may result in sudden death. Syphilitic myocarditis may result in a gradual weakening of the heart (decompensation) with swelling of the liver and fluid may collect in the lower limbs (edema) and in the abdomen (ascites, dropsy).

The liver:

The liver may become enlarged due to the formation in it of many syphilitic tumors (gummata) and the condition is known as syphilitic cirrhosis; in the advanced stages dropsy occurs and death soon results.

The rectum:

In the later stages of syphilis, the rectum, the lower part of the intestinal canal, may develop at its outlet, the anus, a number of moist sores (condylomata) and these are covered by a grey moist coating. The rectum itself may develop syphilitic deposits (gummata) in its wall which may result in a marked narrowing (syphilitic stricture) of this tube causing the stools to be tape-like. These strictures have an iron-like consistency and do not recover easily without operative measures.

The arteries of the brain:

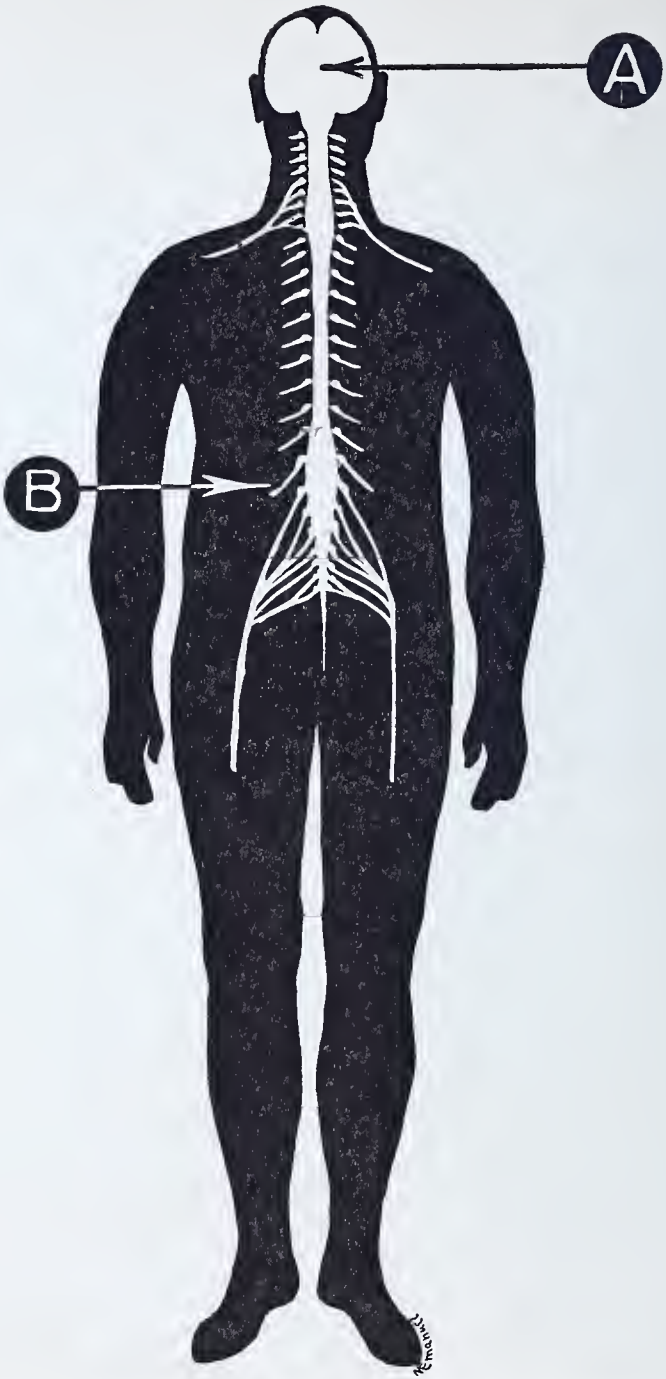
Along with the syphilitic involvement of the arteries all over the body which results in high blood pressure and often Bright's disease of the kidneys, the hardening of the arteries that supply the brain plays an important role in mortality. At about the fourth or fifth decade of life one of these arteries is likely to rupture and result in an apoplectic stroke with paralysis of the right or left half of the body. Death may ensue then or later due to a recurrence of the same thing. Apoplectic strokes before the age of 50 are nearly all due to syphilis; most strokes have a syphilitic background and it should be remembered that apoplexy ranks high in the list of causes of death in the American statistical tables of mortality.

The central nervous system:

The brain and spinal cord are the central nervous system that controls the body. They are invaded by the spirochaete in the early secondary or possibly in the latter part of the primary stage of syphilis. This invasion manifests itself by symptoms and signs and changes in the spinal fluid. (See Book III, Chap. 2B.) The latter may be present *without the syphilitic patient showing any clinical signs that the nervous system is affected.*

As a rule the symptoms of syphilis of the nervous system (neuro-syphilis) become manifest from ten to twenty-five years after the disease is contracted and commonly occur in three types.

1. General Paresis (or softening of the brain)
2. Tabes dorsalis (or locomotor ataxia)
3. Cerebrospinal syphilis



SYPHILIS—STAGE III (TERTIARY, FEATURING NEUROSYPHILIS)

A Involvement of the brain (general paresis or softening of the brain)

B Involvement of the spinal cord (tabes dorsalis or locomotor ataxia)

In general paresis the involvement is chiefly that of the brain. The patients usually gradually show forgetfulness, deterioration of their writing and their mathematical ability and difficulty in the pronunciation of certain words. They become confused mentally, and due to unexpected and recently discovered unreliability they often lose their jobs. They often have delusions that they are being persecuted, or that they have unusual ability and that they resemble or really are famous persons as for example Napoleon (delusions of grandeur). They become physically weakened, careless of their persons and filthy and are committed early to hospitals for the insane. Their course downward is usually less than three years and finally due to general weakness they become bedridden, have paralysis of the bladder and rectum and die as a rule of blood poisoning brought about by infection of the bladder and kidneys or in some instances death follows a stroke of apoplexy.

Locomotor ataxia (tabes dorsalis) occurs usually also in the fourth or fifth decade. It often begins with neuralgic shooting pains in the lower extremities and the gradual onset of difficulty in walking. There is loss of control of the finer movements of the hands and of the perception in space of the position of the hands and particularly of the feet. The patient needs to follow his feet with his eyes and consequently he stumbles and falls in the dark. He sways even when standing erect with his eyes closed and his gait becomes staggering and "flopping" in type. The course is usually five, but often twenty years in length and due to the loss of power he finally becomes bedridden and develops infection of the bladder and kidneys and succumbs. Usually the suf-

ferers show no mental deterioration. The famous poet Heinrich Heine was bedridden at the end but was quite able to write from what he cynically called his "mattress-grave." Sometimes however tabes dorsalis presents some mental symptoms which are usually minor in intensity and of rather short duration and we refer to these cases as tabo-paresis.

There are cases of syphilis of the central nervous system which show a variety of combinations of symptoms probably due to patchy involvement of the brain and cord by the disease and these irregular forms are generally referred to as cases of cerebrospinal neuro-syphilis.

In addition to the three above mentioned groups of neuro-syphilis which give symptoms and signs, there is a type that is *symptomless*. This can be diagnosed only by means of the various laboratory tests which can be made upon the spinal fluid. (See Book III, Chap. 2B.) Its presence cannot be suspected by the patient. It can be found only upon routine examination of the spinal fluid. These changes make a fourth class known as asymptomatic neuro-syphilis, an insidious condition rather than possibly a disease in which deposits of spirochaetes, smoldering in the central nervous system, may at any time cause a conflagration. These conditions develop as a rule into the type known as cerebrospinal syphilis.

This shows the great importance of examining the spinal fluid of any syphilitic at stated intervals even though the blood has long been negative to Wassermann tests.

The involvement of the central nervous system is as a rule the longest deferred type of tertiary involve-

ment but is also the most important and greatest to be feared. Along with the involvement of the arteries of the brain and the heart muscle it forms the most important cause of death to be laid at the door of syphilis.

Syphilis in the female adult

The description thus far has been that of a case of untreated syphilis in the male, the duration of which will be taken up later.

Sexually acquired syphilis in the female shows certain differences from that of the male on account of anatomical differences in their genital organs. We refer chiefly to the primary stage, the stage of inoculation and development of the chancre.

As in the male, the inoculation of the female occurs through an abrasion of the skin or more usually of the outer genital mucosa and this is just as likely to occur deeply within the vagina as at the outer or more easily visible parts. Naturally, when hidden, the chancre can develop and run its course without being noticed at all by the women chiefly because it is *more or less painless.* At the vaginal outlet there is likely to be some swelling and irritation, but even here the difficulty of self inspection of the parts may allow it to go on for some time and even to heal before it is really noticed. The female is therefore more likely than the male to gradually pass into the secondary stage of syphilis without a diagnosis.

In fact it is extremely unlikely that the primary lesion of the vagina or cervix is ever seen by the physician, although those at the outlet are often seen.

After the primary stage, the picture in the female

does not differ materially from that in the male, except that as in other diseases the incidence of lesions in certain organs and locations is likely to differ somewhat in the two sexes. For example, spirochaetal localization in the spinal cord with the occurrence of locomotor ataxia is comparatively uncommon in the female.

Syphilis and pregnancy

The infection of women in relation to pregnancy deserves special comment. The matter is more complicated than it might seem to the layman and all angles of it have not been thoroughly worked out and substantiated from a clinical standpoint, because it must be thoroughly realized that the modern conception of syphilis dates only from 1905, 1906 and 1912. Since the above dates only a quarter of a century has elapsed for the modern clinical study and evaluation of the cause and modern scientific treatment of a disease, the germ of which has been known to lie dormant, to wake in the victim even *half a century later.*

It is an undisputed fact that a non-syphilitic female *may* cohabit with a syphilitic male and *not* become inoculated with syphilis, either by way of the skin or mucosa regardless of the stage in which the male may be at the time of contact. But if that same female becomes pregnant by a syphilitic male, she has a very strong chance of becoming infected with syphilis and of developing a syphilitic fetus or offspring.

Strange to say, this pregnant mother who has been inoculated with syphilis at the time of conception is

not likely to develop clinical signs of syphilis at all during the pregnancy and while her blood usually becomes Wassermann positive, it may be either quite negative in one mother in six, and in two mothers out of five that are tested the blood examinations are not of themselves satisfactory for diagnosis.

If however a *normal pregnant woman* acquires syphilis some time after she has conceived, she is quite likely to develop the usual symptoms of syphilis that are ordinarily expected in non-pregnant women.

How then does the infection of the fetus occur? As simple as it may seem, the explanation of this offers difficulties and we shall attempt to elucidate it without confusing the reader too much with certain controversial points, which however cannot be completely ignored.

It is self evident that a normal pregnant woman may acquire syphilis during the pregnancy. Should this occur *before* the fifth month of pregnancy, the fetus is practically certain to be infected by its mother, and this infection *may also occur* if the syphilitic infection is acquired by her during the latter months of pregnancy. Also treatment of the mother begun in the first five months of pregnancy is almost certain to prevent syphilis in the offspring, if it is continued to term.

The usual thing however is a pregnancy resulting from a syphilitic male and a non-syphilitic female. Without the institution of treatment the mother is quite likely to bear a syphilitic fetus and to deliver a dead fetus or a living syphilitic child. Is such a woman syphilitic although she has shown no signs of syphilis during her pregnancy? Has she a type of latent syphilis or did she or can she escape unscathed?

Or if she is syphilitic did she get syphilis from her mate and transfer it to the offspring? Did the syphilitic spermatozoon of the male semen infect the Graafian follicle of the ovary of the female, and as the fetus developed did *it* transmit the disease to the mother?

We do not intend to enter into all of these controversial points but will state that there are arguments for and against all views. Certainly a woman that conceives a syphilitic fetus from a syphilitic male and bears such a fetus *becomes syphilitic.* Such a woman is *latently* syphilitic regardless of the result of the Wassermann test.

A century ago Colles in his famous enunciation in 1837 stated that: "A syphilitic child cannot infect its mother but can infect others that are non-syphilitic." He had noted that syphilitic infants could infect the breasts of normal wet-nurses but not those of their own mothers. He thought that the child's mother was immune because she had no outward signs of syphilis. His clinical observation was excellent but his deduction was incorrect. We know that the mother was *immune because she was herself latently syphilitic.* The lack of symptoms during pregnancy and the immunity that the carrying of a syphilitic fetus confers suggest a sort of modified syphilis, which is in a way similar to that conferred against small-pox by vaccination with cow-pox vaccine.

The carrying of the syphilitic infection by the spermatozoon of the seminal fluid is also doubted by many. Certainly it has been proven experimentally that the seminal fluid of some syphilitic males is infectious; laboratory workers have been

able to induce syphilis by inoculation of human seminal fluid into apes.

Again some authorities doubt that the spermatozoa themselves can carry infection to the Graafian follicle (the ovum) but they have this to prove.

In clearing up some of these points the Wassermann test helps but only to a certain extent, because the percentages of negative Wassermann tests in latent syphilis is quite large and syphilis in the course of pregnancy is certainly *latent syphilis.*

So the diagnosis of an obscure syphilitic taint in a pregnant woman is at times most difficult on account of the latency of the disease in pregnancy, unless a history or an examination of the husband throws some light on the matter. This is, of course, the case when the woman's blood is Wassermann negative and at times the diagnosis of syphilis unfortunately cannot be made until a syphilitic fetus or child is born.

Syphilis in infancy and early childhood

This most important subject divides itself naturally into several parts.

Acquired syphilis in children

As in the adult, syphilis may be acquired at birth, or any time thereafter in childhood.

A normal child may be infected in the birth-canal by a mother who has acquired syphilis late in pregnancy. If it escapes this, it may be infected by the mother or other syphilitics through kissing. It may acquire this from nursing, a very complicated method of transmission. The mother who has acquired

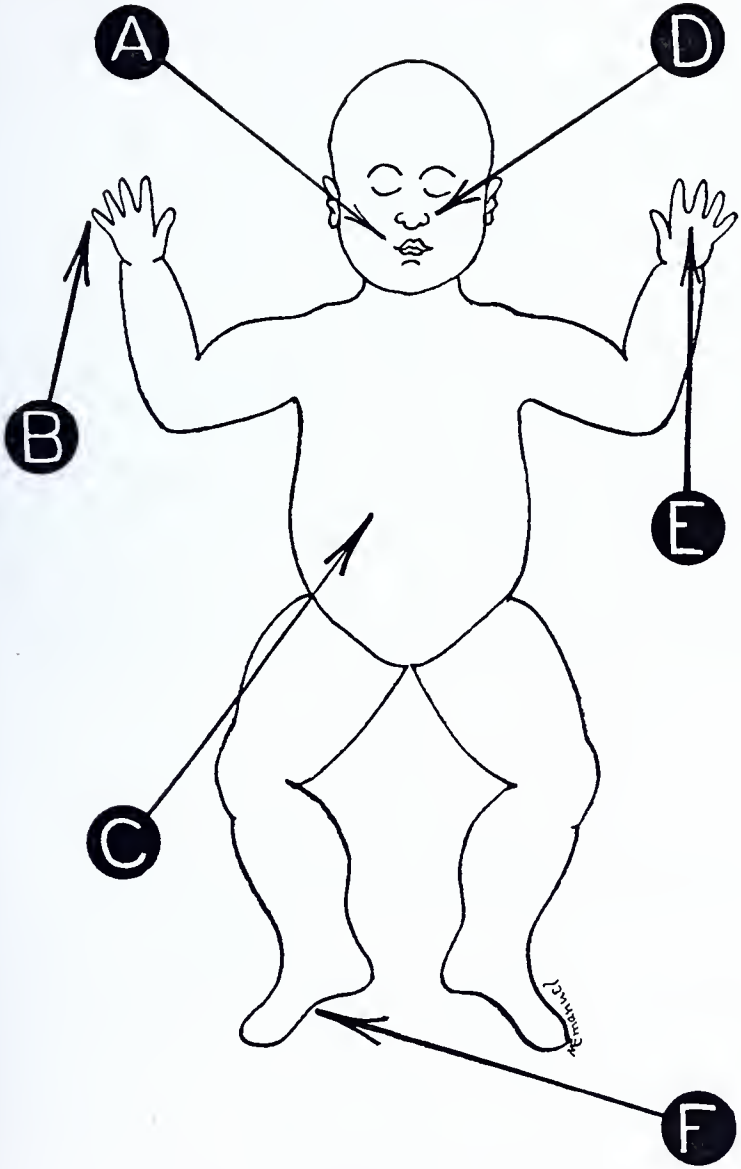
syphilis late in pregnancy may infect the mouth of her own normal infant by means of the blood or serum exuding from her cracked nipple; it is doubtful and certainly has not been proven that the germ can be transmitted through human milk of a syphilitic mother or wet-nurse. However, in the case of a wet-nurse who is nursing her own syphilitic child, the sputum of this child may be transferred from an uncracked nipple to the mouth of the normal child. Also the syphilitic customer-child can infect the nipple of the normal wet-nurse, especially in institutions. Likewise spoons and cups, clothing and fingers of nurses and attendants are a possibility for transmissions.

The performance of the rite of circumcision, transfusion of blood and sexual infection in older children must be borne in mind as means of transmission to the child.

Congenital syphilis

Congenital syphilis is inherited syphilis. The reasons for the separation of this clinical picture into two parts, namely, *early* congenital and *late* congenital syphilis, are not clear in the light of the modern conception of syphilis. They are merely clinical. Research may later solve the classification by showing that the different types are the outcome not necessarily of incompletely treated parents, but possibly of single or double parental infection of the ova or some other type of inoculation.

Certainly division of congenital syphilis into the early and late groups, is a division of value in diagnosis and is based on excellent clinical observation that preceded the modern era of the discovery of



CONGENITAL SYPHILIS (Early Stage; up to the sixth month)

A Fissures of the lips
B Deformed nails
C Involvement of the liver
D Nasal inflammation (rhinitis); "snuffles"
E-F Scaling and other types of involvement of the skin, often of the palms and soles

the germ and the blood test, and has still for the most part stood the test of time.

It should be understood there are two distinct periods in the child's life during which the symptoms and signs of syphilis are likely to appear.

The early stage of congenital syphilis is up to the seventh month but symptoms appear as a rule two to eight weeks after birth. Those passing the third month without symptoms are less likely to have the disease appear in the late congenital period. However, the most unfortunate cases of late congenital syphilis are probably those in which the early symptoms were slight or overlooked or even neglected, and with the usual tendency of syphilis, the lesions healed spontaneously and disappeared, while the untreated patient passed into the latent stage only to have the late clinical stage of symptoms develop.

The late clinical symptoms of congenital syphilis appear usually between the ages of seven and twelve years, although occasionally they may appear at puberty and have been noted in the young adult.

Infants that show marked syphilitic changes at birth rarely survive long. Eliminating the miscarriage of the fetus which occurs at almost any month in its development the syphilitic infant which on birth shows marked skin lesions such as pemphigus, a disease of the skin having blisters of various sizes, rarely survives very long.

Early congenital syphilis

As stated before the syphilitic new-born child that is viable usually presents nothing that would suggest disease. It may be slightly underweight and

frail and show the typical *claw-nails* of the fingers; the nails look as if they were "pinched together from side to side."

The first manifestations are more apt to be delayed from two to eight weeks after birth.

The skin

Among the earliest manifestations are the rashes. These are as a rule very superficial and dry; they may be located anywhere but more commonly on the palms or soles where even cracking of the skin may occur. At times in other areas they may be moist and weeping, similar to the ordinary eczematous rashes but they do not form the deeply punched out types of ulcers as are seen in tertiary lesions in the adult.

The nose, mouth and throat

The most common occurrence is the coryza or cold in the head. This snuffling like a bad cold in an infant is frequent and diagnostic but hardly suggests syphilis to the lay public. This type of infant is of course dangerous to a wet-nurse. The inflammation of the lining of the nose is rarely severe enough to produce a bloody or foul discharge as sometimes occurs in later congenital syphilis.

The lips are very apt to have cracks and fissures especially at the angles of the mouth. There may be grey mucous patches on the roof of the mouth and soft palate. More rarely the inflammation involves the throat with the development of laryngitis; the child is hoarse, has a queer cry and the voice may even be lost.

The abdomen

There is often a peculiar pallor of the skin, a sort of "café au lait" color; rarely there is jaundice.

The mother sees nothing more, but a careful examiner may find marked enlargement of the liver and the spleen.

The genitals and the anus

The skin in these regions is likely to be the seat of small moist greyish patches, known as condylomata, the discharge from which is very infectious, being loaded with spirochaetes.

The extremities

Quite commonly there is noted marked tenderness of the thighs, legs, and upper arm, especially around the larger joints like the knee and elbow. This tenderness around the joints is due to inflammation of the growth-centers of the long bones (epiphysitis).

The intermediate stage of congenital syphilis

This stage is between the *early* and the *late* clinical stage of syphilis in children, between the end of the first and the fifth or sixth year. During the early part of this period the child may develop the rather typical "old man's facies" or physiognomy, which is suggestive but not diagnostic. The child is delicate and has, as a rule, a rather "café au lait" complexion. He may be a "feeding case" with poor digestion and poor assimilation; often undersized and not gaining weight; a wet-nurse is often advised. The top or

larger fontanelle often closes early before the eighteenth month and the head is rather undersized and may have small, bony irregularities.

The lymph-nodes, small masses, are to be found enlarged in all regions of the body such as the neck, groin and the bend of the elbow. They are smooth discrete shot-like, easily felt and movable beneath the skin.

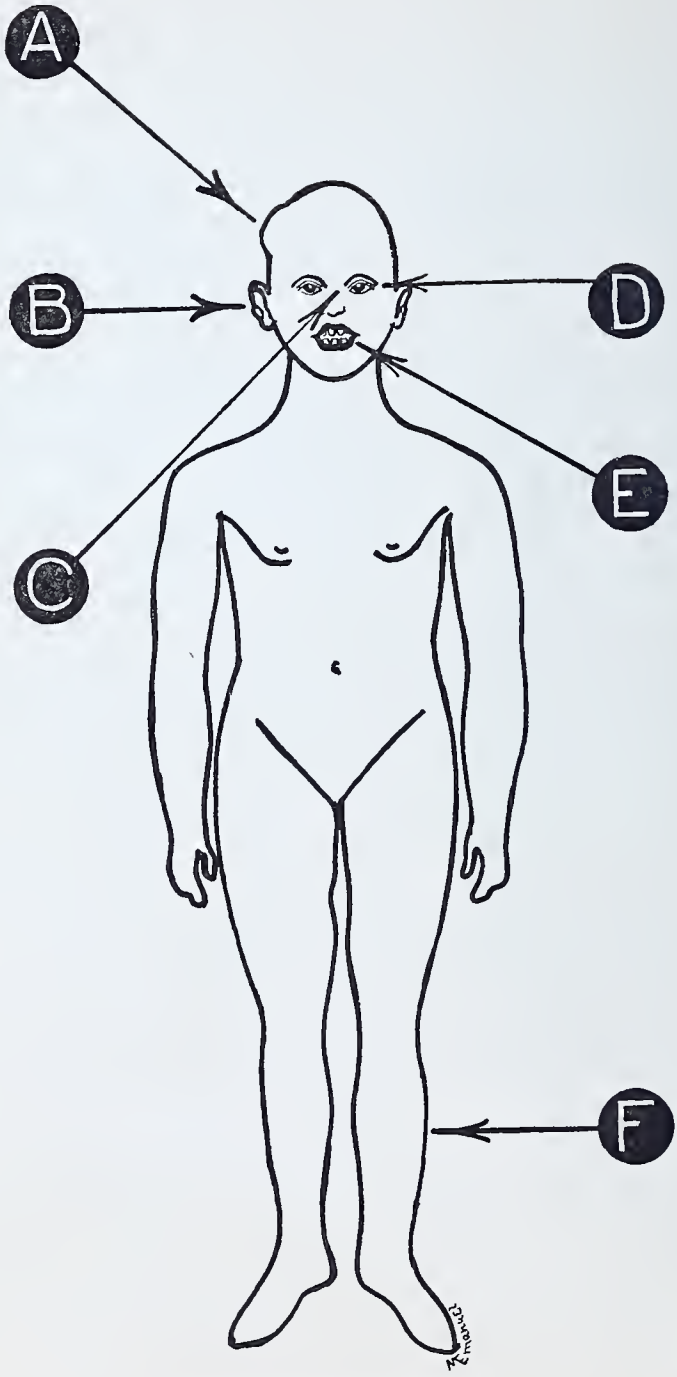
The cracks or fissures of the lips and especially those at the angles of the mouth may have healed with scars (rhagades) or puckered formation (purse-string mouth). In a year or so the bones may begin to show changes, with enlargement and tenderness of the fingers (dactylitis) and small bones of the hands and feet beyond the wrist and ankle joints respectively. The shafts of the long bones of the upper extremities and especially the shin bones may show tenderness and even beginning irregularities due to early inflammatory deposits below the outer coat of the bone (periostitis).

The x-ray is of great value in demonstrating these insidious changes and making an early diagnosis before the child passes into the next or late stage.

The child may be irritable and complain of headaches and sleep poorly, and a diagnosis of involvement of the brain is to be suspected. Mental retardation may begin to be noticed. Paralysis of the right or the left half of the body (hemiplegia) may occur and blame is laid upon nurse maids, who are accused of having dropped the child.

Spinal puncture and examination of the fluid removed from the spine may give much information. (See Book III, Chap. 2B.)

The signs develop from time to time, but by the



(See key on page opposite.)

end of the sixth or seventh year, we arrive at a period extending up to the twelfth or thirteenth year, or even almost to puberty, during which the so-called *late symptoms* of congenital syphilis develop into a clinical picture. *The saddest blot on civilization* are these "innocents," the harborers of lesions, which are in most or at least in many instances already irreparable, by the time modern medical science is given the chance. It may still be possible to eradicate the infection, but the damage already done is for the most part beyond human aid.

Late congenital syphilis

This is a clinical picture well known to and well described by the older pediatrists (specialists in diseases of children) before the modern era of syphilology. It is a picture that is strikingly manifested by these unfortunates, who have struggled along undiagnosed and untreated into the grade school age of seven to thirteen and even later.

They are usually undersized, delicate, sallow and anemic looking with pathetic deformities and as a rule retarded mentality, so that they may be in the Grade Schools until or beyond the age of puberty. Incidently, puberty is often delayed. In some in-

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CONGENITAL SYPHILIS (Late Stage; sixth to fourteenth year)

A Irregularities of the skull (nodes, bosses)
B Hearing difficulties (even to complete deafness)
C Deformities of the nose (saddle-nose is common)
D Vision (interstitial keratitis with blindness)
E Dental deformities (Hutchinsonian teeth)
F Shin-bone inflammation and deformity (saber-tibia)

stances they may be so defective as to be idiotic, epileptic and subjects of dementia (mental deterioration), helping to fill our institutions for the feeble-minded.

Aside from the disastrous effects of the disease upon these children, there is added the fact that syphilis in this period of childhood may produce facial changes which give them an appearance which at best is peculiar and at the worst may be unsightly due to the fact that some of the important changes are about the head and face, so that their appearance has a tendency to discount them at the very start of life. These deformities are of the contour of the head, of the eyes, of the teeth and of the bridge of the nose, so that the diagnosis can often be made at a distance by a trained observer.

The head:

This is often below the average in size due to the fact that in infancy, the fontanelles fill in and the joints between the various bones that make up the dome of the skull unite much earlier than usual; also there may be irregular knobs on the skull which are noticeable.

The blear-eyed child is not always, but may be, a victim of syphilis. Watery eyes with a tendency to squint and thereby to partly shut out the light may be due to inflammation of the iris and if not treated promptly will result in defective vision. Involvement of the choroid and retina as a cause of blindness may be diagnosed with the ophthalmoscope. However the most characteristic involvement of the eye causing blindness in late congenital syphilis is *interstitial keratitis.* This consists of an in-

flammation of all the layers of the cornea, that clear transparent, glass-like portion forming the front part of the eye. This gradually becomes blurred and finally develops a frosted-glass appearance, so that the passage of rays of light is impeded. Even if the eyes and the underlying disease, syphilis, are taken in hand at this stage the outlook for the restoration of sight is almost hopeless.

The first teeth appear rather ahead of schedule and decay easily and early. Some of the permanent teeth, notably the two upper middle biting (incisor) teeth often show concave half-moon-like defects in the cutting margin and other teeth are peg-like or screwdriver-like. These deformities are characteristic diagnostic deformities and are known as Hutchinsonian teeth.

The nose and palate:

In this period there may be a persistent discharge from the nose which may be at times blood-tinged and foul-smelling. Disease of the bones forming the partition (septum) between the two sides of the nose occurs with destruction of the bones and cartilage and there is often perforation of this septum. Finally a sinking of the bridge of the nose occurs with the deformity known as *saddle-nose,* and these unfortunate children carry the stigma of syphilis on their faces for life.

This inflammation may extend into the throat and involve the soft palate with perforation and marked destruction of it. Plastic surgery is, of course, the only hope of salvaging some of the defects and can be attempted in early juvenile or adult life according to the judgment of the specialist in this line of work.

The skin:

Typical punched-out ulcers may occur anywhere on the skin but usually on the face, thighs, or over the upper third of the shin and when these ulcers heal, they leave the thin tissue-paper-like scars resembling the vaccination scar of smallpox and these scars are usually diagnostic of syphilis. Under the skin are to be found small shot-like lymph glands in the regions of the neck, groin and armpits.

The abdomen:

Here there are few visible signs, but the examiner may find a large liver (cirrhosis) with free fluid (ascites) in the abdomen but jaundice is rare. The kidneys rarely give symptoms.

The extremities:

Deformities and irregularities of the long bones are common, especially of the shin-bones, and these are characteristic and diagnostic and are known as the *saber-tibia.*

Any of the joints may become tender and inflammed from time to time, the knee-joints being most commonly attacked.

The brain and spinal cord:

Mentally retarded, with a slow development of speech and other functions before the seventh year and often supposed mental dullness due to difficulties in hearing, these children begin life with a handicap.

They may be frail and subject to attacks of vomiting and dizziness for no apparent reason. Sometimes these attacks are severe and transient attacks of cross-eyes (strabismus) may occur, but such symptoms are due to real involvement of the coverings

of the brain (subacute syphilitic meningitis) and a spinal fluid examination usually substantiates this.

Sometimes an attack of paralysis of one half of the body (hemiplegia) occurs and leaves them limping for life. Finally, but rarely, there are seen typical cases of general paresis and tabes dorsalis in juveniles.

Following our plan outlined in the beginning of this chapter, an exhaustive treatise upon syphilis has not been given, but an attempt has been made to give in a practical way the symptoms and signs which should be noticed by the intelligent layman and which should send him to seek medical opinion. The aim has been to enumerate and in a way to describe the conditions which might underlie those symptoms which the competent physician may find if they are present.

Let it be again made clear that the author is not desirous of instructing the layman in diagnosis, and certainly does not intend to initiate him into self treatment of such a complicated disease.

He is merely enlisting him as an individual non-professional aid in preventing the oversight of important and usually early symptoms of syphilis in himself and his family.

There is no desire to give him a "little learning" along the lines of treatment, as the beginning and the duration of the treatment of this complicated disease is the function of the trained physician.

It is chiefly for these reasons that the details of treatment are not stressed in this book. It could hardly be misunderstood that the dearth of information given along this line is due to a lack of interest in the eradication of the disease.

The feeling is that the eradication of the disease

can be most effectively accomplished by early diagnosis, which will be enhanced by any knowledge of the disease that the layman can acquire and that this is part of the "campaign of education," by far the *most important part,* as it will bring to treatment cases in the early and more easily curable stages.

Such cases can best be unearthed in this way, rather than by *regimentation,* as this method will be resisted by the sufferers and furthermore the whole problem of diagnosis is not merely a laboratory problem as will be developed in the next chapter on the "Diagnosis of Syphilis," in which the futility of *mere laboratory diagnosis is stressed.*

CHAPTER 4

THE DIAGNOSIS OF SYPHILIS

The difficulty in presenting data to the layman on the diagnosis of syphilis may be inherent in this, that the layman cannot be summarily made into a diagnostician, but should seek medical advice as soon as he sees signs which lead him to suspect that something is wrong, and should not try to decide that these signs are of slight or great importance.

To begin with it must be made clear that syphilis is a very prevalent disease with a certain usual (genital) type, and certain less usual (non-genital) types of inoculation; that the signs of the early stages (stages I and II) are usually open to inspection but those of the later stages (stages III and its special sub-division of brain and spinal cord involvement) reflect an attack on hidden vital organs and are hence latent until some symptoms or signs become manifest; that early diagnosis is of importance in making possible prompt treatment, which gives a higher percentage of cures and allows a shorter period of treatment in order to accomplish cure.

With this in view we shall attempt to outline some of the methods of diagnosis, and try to correct certain misconceptions which the layman may have.

On account of the fact that syphilis is one of the diseases in which during the last twenty-five years the modern laboratory methods have been of great aid,

much publicity has been given to these features and the layman has obtained the misconception that these tests are *all that is necessary* for diagnosis and for the determination of the rate of recovery and final cure. These are "half-truths," and our attempt is ultimately to correct them.

Let him again consult the history of syphilis (Book II, Chap. 1) and he will see that syphilis was diagnosed and treated for four hundred years before the modern laboratory tests (1905-1906) and Salvarsan (1909) and bismuth were available.

The modern diagnostic laboratory means at our disposal are (1) the microscopic method by means of which the spirochaete is found; (2) the examination of the blood which gives evidence of an *active syphilitic process* somewhere; and (3) the examination of the spinal fluid, which may show an *active syphilitic process* in the covering membrane (the pia) of the brain or spinal cord.

The microscopical diagnosis of syphilis

The secretion exuding from the chancre *usually* contains the spirochaetes in large numbers. If the sore, which is usually, but not necessarily always, found upon the genitals, has been kept clean, and has not been treated with antiseptic powders or by cauterization, the spirochaetes are generally found on the first examination preferably by means of the dark-field microscope. This, of course, means a diagnosis in a very early stage, possibly before few if any of the germs have entered the circulating blood. They therefore may be found even before the examination of the blood by means of the Wassermann

test gives even the slightest evidence of general involvement of the body.

In the event the spirochaetes are not found, several tests of open sores repeated within the next few days should be instituted, so as to make diagnosis certain, if possible, in the pre-Wassermann stage of the disease.

As already mentioned the chief cause of failure to find the spirochaetes in the local lesion is *the condition of the lesion itself.* In addition to the aforementioned causes of this condition, the one of foremost importance is that of "secondary infection" of the syphilitic chancre by *other germs,* which causes softening of the tissues, a condition resembling the true *chancroid* or *soft chancre*; in these secondarily infected sores the great amount of pus which is present may make it difficult or impossible for the examiner to find spirochaetes.

In the event of a failure to clinch the diagnosis of syphilis in the early part of stage I, it may unfortunately be necessary to wait two to four weeks until the blood becomes Wassermann positive.

The blood test for syphilis

By means of a syringe and needle blood can be easily drawn from a vein at the bend of the elbow. The blood *itself* is not examined but is allowed to clot and the amber colored fluid (serum) that separates from the clot is used for the examination; it is kept in the refrigerator until needed.

We shall base our discussion of blood tests exclusively upon the Wassermann test for reasons stated previously elsewhere.

The value of the Wassermann test of the blood

Unlike the microscopic test, this test does not primarily reveal the spirochaete itself. It does reveal the presence of a material (syphilitic amboceptor or reagin), which is an evidence of the activity of the syphilitic spirochaete in the tissues of the body.

The test is usually reported as follows:— Negative; 1-plus (weakly positive); 2-plus (moderately positive); and 3- and 4-plus (strongly positive).

Clinical experience has shown that strongly positive reports in cases for diagnosis *mean syphilis,* even though there are no physical signs to be found. This is latent syphilis. On the other hand a report of a weakly positive or even of a moderately positive test is of questionable diagnostic value, unless fortified by an excellent positive history and physical signs; and we prefer both of them.

A slightly positive reaction and especially a reaction developing to moderate strength in a case presenting a suspicious looking sore in which spirochaetes have not been located upon thorough and repeated search is acceptable diagnostic evidence of syphilis.

In the secondary stage with its manifestly dramatic triad of physical signs the Wassermann test achieves its greatest regularity and value; we can expect practically all such cases to be strongly positive.

In the tertiary stage of syphilis we meet with a most unfortunate situation, in which the reaction may be negative in even 35-40% of the cases. Strong reactions in latent cases are of course diagnostic; weakly and moderately strong reactions require forti-

fication by history and physical signs. The negative test in about one third of all tertiary cases is the greatest hurdle to clear.

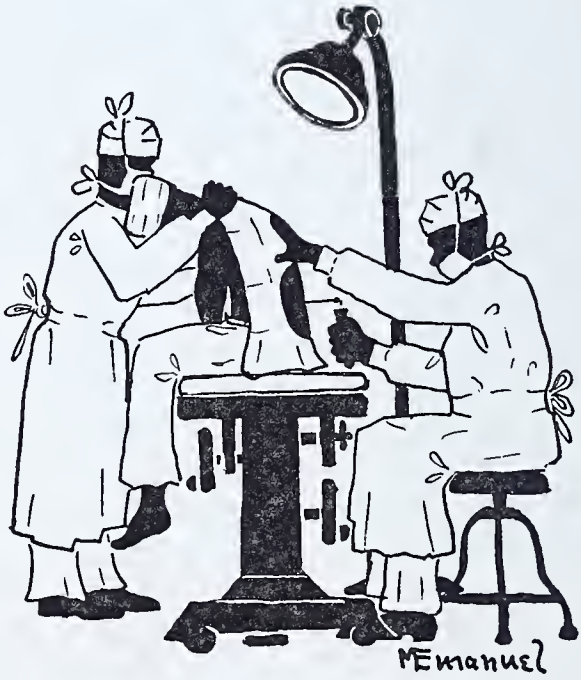
Nearly all cases of syphilis in *pregnant women* are *latent*. The blood test upon the prospective mother is at present in the public eye on account of very recent (1938) legislation, especially in New York State. When strongly positive *all is well* and authoritative statistics (Jeans & Cooke) show strongly positive bloods in 57.5% of 647 mothers who delivered themselves of syphilitic children. The futility of absolute reliance upon and implicit faith in a mere Wassermann test of the blood in latent syphilis is especially shown in syphilis of pregnant women, most of which is *latent syphilis*. The question is, what about the balance of these 647 women amounting to 42.5% of the cases? Of the total number of 647, there were absolutely negative reports in 14.2%. In other words almost one woman in six could *not be diagnosed by a blood test*.

The remainder of the cases totalling 28.3%, about one quarter of the total, showed blood tests which were *not negative* but *were* questionable, as far as absolute diagnosis is concerned.

These cases were slightly or moderately positive due to Wassermann tests made with supersensitive technic. (See Book III, Chap. 2B; section on the quantitative Wassermann test.)

The percentage of negativity in cases subjected to the Wassermann test further depends to a certain extent on the amount of treatment that they may have received or are then receiving. This is difficult to evaluate but it certainly has some bearing on the subject under discussion. Syphilis is one of the

diseases which par excellence has a penchant for being easy to control. Under even a moderate amount of treatment syphilitic symptoms and signs will recede and the blood reaction may and often does diminish in strength or even become negative. This does not mean *"Complete Cure."* The blood reaction and the lesions have a tendency to sleep *only to reawaken* at the most inopportune times.



THE SPINAL PUNCTURE

The spinal fluid and its tests

This fluid is easily drawn from the spine by means of a long special hollow needle, the skin of the back having previously been cocainized. Normally it looks like distilled water. In syphilis of the brain or the spinal cord the fluid may look normal but

when examined microscopically and chemically it may show changes from the normal. In addition to this it may and often does show a moderately (usually a strongly) positive Wassermann test.*

The meaning of the spinal fluid tests

The action of the spirochaete upon the brain is usually confined to the important nerve-cells of its outer layer. As the thin pial membrane, which covers the brain, is approached and involved, certain changes occur in the spinal fluid. It is generally conceded that these changes occur *only under these circumstances* and that their presence indicates *active,* even though slow or chronic, inflammation caused by the syphilitic germ, and that even slight changes in the spinal fluid are significant of smouldering activity.

There is *no connection* between the blood and the spinal fluid. Consequently the spinal fluid may be Wassermann positive and the blood negative and vice versa. However, practically all cases of general paresis are strongly positive to the Wassermann test, in both blood and spinal fluid.

The same cannot be said of tabes and cerebrospinal syphilis.

Suffice it to say that in a syphilitic any deviation from the normal in *any of the four recognized tests of the spinal fluid* should be considered evidence of involvement of the central nervous system, even though there are *no symptoms;* this latter type is

* Spinal Fluid Tests:—The four tests regularly employed are the cell count; the globulin reaction; the colloidal gold test of Lange; and the Wassermann test. (See Book III, Chap. 2B.)

called asymptomatic neuro-syphilis. In other words, while a positive Wassermann test of the spinal fluid is diagnostic of neuro-syphilis it is *not absolutely necessary for such a diagnosis.* In its absence in a syphilitic subject the positivity of the other tests are sufficient to warrant a diagnosis of early neuro-syphilis or of very chronic or temporarily inactive neuro-syphilis.

It is enough to state that these latter types of syphilis as a rule deserve treatment until the spinal fluid returns to normal. (See Book III, Chap. 2B: The Spinal Fluid and Its Tests.)

The inadequacy of mere laboratory methods in the diagnosis of syphilis

Up to this point we have discussed the value of the various laboratory methods in the diagnosis of syphilis. From the preceding it is quite clear that the laboratory has a distinct place in diagnosis, but *by itself* it is not thoroughly satisfactory in all cases. As long as the tests are positive or positive enough for diagnosis, the laboratory method is satisfactory. But there is too large a percentage of cases in which one cannot arrive at satisfactory conclusions merely from laboratory data. As a matter of fact in using a laboratory approach, at the very beginning of the study of a case, one is putting the cart before the horse.

Regardless of the disease under consideration a patient should be studied in a routine *clinical* way, and syphilis is no exception to the rule.

Any case should be approached by taking a careful history and making a careful general physical

examination, allowing the laboratory data to follow and be considered *at their proper value.*

It is necessary that the taking of the history be done in a *most active* rather than in a passive or desultory manner on account of the protean and multiform nature of the aspects of this disease and especially on account of the fact that it often extends over a period which may embrace many decades and may have periods of latency measured even by decades. For this reason history-taking in syphilis is an art, and the physician must be prepared to run the gamut of all the important organs in the body and the symptoms and signs which they may develop when functioning improperly.

The same may be said of the physical examination, as scars of certain types in certain regions and often very slight changes in size, position or functional activity of some organ or other may make diagnosis possible even without the assistance of the laboratory.

In the absence of the finding of the spirochaete and of the strongly positive Wassermann reaction in the blood, the clinical history and findings may need and utilize weakly and moderately strong Wassermann reactions as accessory evidence, whereas these same reports might of themselves merely cloud the issue or mislead one in diagnosis.

Even a Wassermann test that is persistently weakly positive or certainly one that is increasing gradually in strength, in an early case in which spirochaetes cannot be found, assumes *major importance* in diagnosis.

Thus the *quantitative* Wassermann test, the *provocative* Wassermann test and even the slightly positive Wassermann test in cases that give a history of

long past or recent treatment as well as the study of the spinal fluid by all recognized tests make it often most difficult to evaluate all data. Certainly the history and physical findings are not the least of these; in fact, they often become the major features in diagnosis.

From this it is quite clear that mass-medicine methods of diagnosis based more or less on laboratory tests, the chief of which is the Wassermann test of the blood, give too large a percentage of negativity or questionable value in the report per se for the careful clinician to rest too strongly upon them.

Medicine is after all an art and while in syphilis it has approached or tended more in the direction of science and mathematical accuracy, the stressing of this has tended toward giving the laity certain half-truths, which may give them a false sense of security and may end by instilling distrust.

Mathematics has a questionable place in the diagnosis of many cases of syphilis and certainly in the treatment of many if not all cases of this complicated disease. (See also Book III, Chaps. 2B and 2D.)

BOOK III

CHAPTER 1

THE WAY OUT:—THE PRIVATE PHYSICIAN AND HIS PLACE IN THE PROBLEM

Medical practice is on the threshold of a mighty change. All physicians have been taught to believe that the sick should be made well if possible and have an inalienable right to health which is necessary before happiness can be pursued, and that this is their right regardless of their financial status. In a competitive civilization physicians have always voluntarily followed to this extent a communistic philosophy to their own financial detriment.

The forces of Public Health conservation are gradually focusing their attention upon the so-called venereal diseases and by declaring them a menace to public and private health are preparing by regimentation to take them entirely out of the hands of the practitioner, who has been licensed to practice medicine and surgery.

Why is this so and who is fomenting this? Is it justifiable? And even if so, is it advisable?

Let us attempt to examine the matter in a dispassionate way.

By 1909, within four years of the date of the discovery of the germ of syphilis, Paul Ehrlich had succeeded in producing a satisfactory specific chemical medicine for destroying it. It required, let us say about five years or so to evaluate this drug, but it was evaluated and acclaimed a specific remedy a

quarter of a century ago. Why then has all this time been lost in regimenting the people of this country who have acquired syphilis out of the hands of the medical practitioner and into those of the Public Health agencies?

The crisis of the Great War urgently required something of this sort and it was not delayed or overlooked then due to prudery. The military regulations in regard to the prevention of venereal diseases were at that time broadcast and widely publicized. In fact, much of this prophylaxis ran along tracks parallel with the prevention of pregnancy. Consequently the stupid wise-cracking products known as "flaming youth," raised not on modified milk but on gin and jazz, assimilated this information. With the excusing and welcome propaganda of "Companionate Marriage," these boobs resurrected the Saturnalian revelries of the ancients, stepping up the pace by means of cheap motor cars bought on instalments, thinking that paper stock-market profits were written on asbestos.

In an age of war and monetary wastage such a program of regimentation would have easily found funds, if its nobility of purpose had been properly propagandized, and none could doubt the "Brutus-like nobility" of such a procedure, especially when a group of economically unorganized white-collar men (the medical profession) were the only ones who might be wounded by it.

A campaign of education is valuable and we are part of it, even though it will not eradicate syphilis completely. In the case of syphilis knowledge is the only power by which we can put into practice methods of eradication. Although there is no specific

preventive agent in syphilis, as is the case in smallpox and diphtheria, yet syphilis has the advantage over tuberculosis, as in this disease we can merely keep its numbers under control.

In the case of syphilis our educational preventive measures are of course not so perfect in result as the vaccination and injection methods for the prevention of smallpox and diphtheria; and our specific treatment methods cannot quite reach the goal of perfection reached by the antitoxin in diphtheria. But syphilis occupies more than a comfortable middle ground, approaching either goal pretty well.

In our present civilization the *machine* and *mass-production* are the Golden Calf we worship, because we are told that it will get us the highest standards of living. The bias of mass-production permeates the minds even of men in high places in medicine. The best example of these is the professional health officer, in whose mind due to his training the bias of Public Health sinks deep roots. He worships these idols.

Even the most conscientious of men with apparently the most unimpeachable aims may be on the wrong track as to how these ends should be attained. The problem of the eradication of venereal diseases is not to be solved by *mass-medicine*. We might even conceive a machine which would mechanically scarify the skin and automatically rub in smallpox vaccine, and we might even imagine patients forming in a long line for the news-reel camera men to record. Such a line of men, women and children might possibly be labelled either the bread-line or the crowds waiting for admission to a World's Series baseball game; but, no, it is a *vaccination line*

and the heart and soul of the professional health officer is better satisfied.

But the diagnosis and treatment of venereal disease is quite a different matter. It has taken centuries to sell even ninety-nine per cent of the people on smallpox vaccination and there are still a few conscientious objectors, while there is no stigma connected with this disease and its prevention. But in venereal diseases we have a different situation. In this book an attempt is being made to remove stigma as far as possible and to do away with prudery. But even if this end is accomplished, of which there is serious doubt, and the elements are removed, the author certainly does not want to attempt to put a halo around the heads of all the victims of these diseases, however they may have acquired them; nor would they all agree to wear one, if it were offered them thrice, like Caesar's crown.

It is his firm conviction that venereal diseases, however acquired, must *always* be a private matter between the victim and the physician, his mediator. The doctrine of regimentation is at present in the limelight, but if applied in the case of these diseases it will destroy not only the *self-respect* of the indigent, as it already threatens to do, but also of all other classes of society, a characteristic not to be weighed and measured in terms of silver and fine gold, but still the hope of the world.

The private physician has from the earliest times occupied a place more intimate than that of the priest. The earliest medical oath prevents him from divulging secrets learned in the course of the practice of the healing art. The professional health officer in the name of diagnosis and prevention would lay

bare the lives of one tenth, or, if gonorrhea is included, of possibly one fifth of the population. Any attempt that has in its program the destruction of privacy will encounter hard sledding at the hands of some patients and *many* physicians. Were this the only way, it would be necessary to bow in submission to expediency.

But there are other ways. The preceding may seem like *destructive* criticism of a good cause and without something to offer in its place it must be considered so. However something *constructive* will be offered. The program of the health officer is interested only in the diagnosis and eradication of venereal diseases at the expense of the tax-payers, without stressing privacy and the feelings and self-respect of the patient.

The physician, who has sworn in the Hippocratic Oath to maintain secrecy in regard to whatever is told him by the patient in confidence, naturally does not agree with the above described attitude and program. He has a right to disagree, as this right is based partly on the fact that for ages it has been the custom of the medical profession to cheerfully carry the burden of the treatment of general ills, even in many cases for totally inadequate fees. Also, regardless of fees the physician feels that he can give more individual attention to these diseases than can be given by *mass-treatment* methods. These cases, being ambulatory and requiring hospitalization only in rare instances and for short periods, lend themselves well as a rule to office treatment.

What have the ear-mark of disaster for the private physician, unless he can be properly safeguarded, are the bills before each House of the Congress, to ap-

propriate a moderate number of millions of dollars and place these funds in the hands of Federal Bureaus to be used as they see fit in controlling syphilis, possibly with the idea of having them control all State and Municipal Departments of Health through the lever of appropriations.

The goal is, of course, that of Denmark, where 85% of syphilis cases are treated free in clinics at the expense of the tax-payer but worst of all *at the expense of the private physicians.*

What is the trouble? Have the physicians after thousands of years failed to merit the trust of the public? Have they failed to keep abreast of things and to treat syphilis properly? If so, is it due to their lack of knowledge? Or to their lack of laboratory facilities which are expensive for the middle class? * Or to the costliness of the new drugs for

* It is an admitted fact that the diagnosis and treatment of syphilis and to a slightly lesser extent that of gonorrhea cannot be carried on according to our present knowledge without repeated examinations of specimens obtained from the patient (such as blood, secretions, discharges, spinal fluids, etc.) and the use of certain drugs devised, advocated or discovered since 1909.

The expense of the laboratory work in particular makes it difficult for the general practitioner to put into practice the scientific method and often drives him into an approximation of it, which is not so good. In order to obviate this the N. Y. City Department of Health has adopted a new attitude. Previously it did such laboratory work only on cases *reported by name as absolutely indigent.*

Recently in their desire to actively enter the movement for the eradication of venereal diseases they have asserted to the practitioners their willingness to do all laboratory work necessary for any patient, unidentified, and will even furnish for his treatment supplies of Salvarsan and other expensive drugs upon request.

It is of course obvious that this is delivering a bodyblow to specialists who make their living only by medical laboratory work on private patients and something should be done about these regulations.

We might mention here that the above regulations refer only to N. Y. City and the magnitude of the problem only dawns upon one when he realizes that to carry out such a program nationally we must also think of large states like Texas and sparsely settled ones like Nevada.

combating syphilis? Or is it due to the fact that they cannot get end results of value, because they have no legal authority to *force* the syphilitic, if occasion arises, to *take treatment from someone somewhere until cured?*

These are all important questions but they *can all be answered,* or at least explained and, if these are the stumbling blocks in the way of the solution of the difficulty, a solution can be reached, which would be better for the public and better for the private physician than the contemplated Scandinavian method. Certainly the present situation is satisfactory to neither faction, nor will it be successful in this country on account of the temperament of the population and their temperamental resistance to regimentation. We are rather sure that regimentation into clinics will be as much of a failure as was the great experiment of the prohibition of intoxicating liquors. As the economic crushing of the physician is both unjust and unwise, comment must be made on these two points and some others.

The physician in this country is living in a competitive civilization. He is working in hospitals and clinics, whether governmentally or privately controlled, *without pay* and is treating vast numbers of cases, many of whom are able to pay some physician. He is thus diminishing the aggregate of private practice and income. His critics say that he is getting experience that way, but those in high positions would not be there if inexperienced, and the underassistants are there mostly for other reasons. The laity are not in the habit of working without pay and most of them assume that physicians are being paid by the hospitals for their services, and are

astonished to find that they are working without compensation.

Thus the physicians are unnecessarily diminishing their own incomes and those of their colleagues. Before the Depression it did not much matter, but conditions have become different now. There should at least be some payment for such services not only in the departments of venereal diseases but all through the hospital system. Even this would help only a little.

The Public Health officials in their propaganda term syphilis a plague and rather exaggerate its contagiousness. A plague is a disease in a class with smallpox, which is practically 100% contagious and causes high mortality among those unprotected by vaccination. Through propaganda of terror they are accomplishing their aim, the Scandinavian program of regimentation into clinics.

But is the practitioner of medicine equipped to treat syphilis and gonorrhea competently? If he is not, he must be made so. Certainly there are not more than a couple of thousand specialists among the Dermatologists and the Urologists, who are available to treat the thirteen millions of syphilitics and about the same number of gonorrhoeics. These sufferers *must* for the most part be treated by the general practitioner. The problem then is the utilization of the general practitioner. If he lacks knowledge of the last word and the up-to-the-minute methods of diagnosis and treatment he can be instructed by departmental heads of the Health Agencies and the hospitals. He should also be given more power of control through a reporting system *with teeth,* such as has been used by some states

through their Health Departments for twenty or more years. *All clinic cases* should be referred to him in his office, if he is willing to accept them at the fees offered by the authorities in charge of such a program.

Were mass-treatment the only way, we would acquiesce, but there are other ways. Such an attitude has been critical but not *destructively critical* and there is precedent for some of its *constructive program* in the workings of the medical divisions of the E. R. B. and the W. P. A. of the Federal Government. By means of this program it is not necessary to regiment, herd and parade these unfortunates openly, and destroy their privacy and self-respect in order to give them adequate treatment.

It is not only unnecessary and inadvisable that mass-treatment methods be used, as the private physician can give as good or even better treatment individualizing on each case, and public funds, State and Federal, are available or could be made to cover the cost of the diagnosis and treatment of these patients.

The American Medical Association is not a union for economic purposes, its main objective being scientific, but it is now being forced to fight for the protection of the income of the practitioner. It has been under fire because it has resisted to a certain extent the gradual unnecessary development of Public Health programs and their encroachment upon the aggregate of medical income with the eventual extermination of the medical private practioner. Up to recently they have been merely rather obstructive but now they feel it necessary to voice their fear of the encroachment by non-medical men upon the

work for which medical men have trained themselves. Their program has already been pretty well explained and outlined by measures which have already been brought before the House of Delegates of the Tennessee State Medical Association by a Speaker of the House of Delegates of the American Medical Association.

The people, crushed by depressions and recessions over which they have had no control, *should be fed,* but no Federal Bureau has ever suggested that this be done at the expense of the butcher and the grocer. However, if these laws in regard to medical attention of the masses and especially in regard to the prevention and control of the social diseases are not carefully drawn so as to take them out and keep them out of politics and leave the program in the hands of the medical profession, this work will finally be done at the expense of the medical profession and this is unnecessary and inadvisable.

Physicians live and die without ever giving a Pasteur treatment for the prevention of rabies merely because the rabies vaccine is so expensive that *it has to be given away free by some governmental agency.* It should be issued to the physician in private practice and he can give it quite as well as some part-time assistant of a Health Department.

A similar thing occurs in our public schools, where all children, many of whom are of families in good circumstances, are immunized against many diseases. This should be done by their family physicians.

The outlook is that most of the cases of venereal disease will shortly be treated by governmental agencies, unless this program can be modified, and

the practitioner of medicine will have to depend on getting as patients the few that still want to preserve their self-respect and not be openly paraded. Even Denmark still has 15% of this sort. Let us accomplish the results that Denmark has, but let us not do it at the expense of the practitioner of medicine and the self-respect of the public.

Venereal diseases will always remain a personal matter and the self-respecting will refuse regimentation, and disappear from observation and treatment, so why not do as little of that as is possible, and the results obtained in Denmark can be surpassed here. Let us treat *all cases,* and *force them to continue treatment to ultimate cure.*

But in so private a matter let us do it in the quiet and confidential atmosphere of a physician's consultation and treatment rooms at the expense of the City or State if necessary. Let us abolish all public departments so far as treatment is concerned and merely have in every community a central station for the treatment of cases that are apprehended or refractory, an appendage of the governmental diagnostic laboratories, and controlled by the Department of Police.

CHAPTER 2

SCIENTIFIC ADDENDA

A. Facts and fallacies about non-venereal transmission of syphilis and gonorrhea

While travelling abroad I met a likable American couple named Williams. I shook hands with the man; he wore white cotton gloves like a metropolitan policeman but did not remove them. Being a physician I asked about it and found that he was abnormally infection-minded; he was a bacterio-phobe, due to that dangerous thing "a little learning."

It is our privilege to enter here but slightly into this question. We are surrounded by myriads of bacteria mostly harmless. Our mouths, throats and intestinal tracts are veritable incubators of untold billions of germs of various kinds, without which we cannot digest our food, without which we cannot live and prosper. True it is that occasionally some on the outside or on the inside play havoc with us physically but it will be worse if we let them make our lives miserable mentally.

I will merely mention the mass of unnecessary bunk or half-truth that is barked over the radio from morning on; the unnecessary packaging of *all sorts* of foods particularly those that have to be cooked at high temperatures by the consumer; the vastly unnecessary use of celophane on foods that have to be cooked.

All of these things are accepted as sanitary but they raise the cost of living. They are American and all right if the money is contributed for esthetic purposes but, don't fool yourself, the advertising man knows you better than you know yourself.

Be like your Doctor; don't become a bacterio-phobe.

To learn how not to be a bacterio-phobe in regard to syphilis and gonorrhea is the purpose of this chapter.

In certain chapters of Book I and Book II it has been here and there stated that in *not all* instances were syphilis and gonorrhea contracted sexually.

No attempt will be made to give the total number of cases (or percentages) of non-venereal syphilis and gonorrhea compared with the number acquired by coitus, as it cannot be done.

Suffice it to say that *there are some,* and there has been so much written about this that the public is in actual terror over it. They are more so because they have heard that certain Boards of Health have issued regulations on these matters and the official finger has been so definitely pointed at certain trades, businesses and their service and products, as to veritably create a phobia among the so-called *informed* laity and a feeling that the chances of infection are enormous.

Not to go deeply into the matter again, we must recall to the reader's mind that the spirochaete of syphilis and the gonococcus are extremely short lived outside of the human body; that unlike the germs of tuberculosis they cannot go into spore (seed-like) formation; that exposure of germ-laden discharges to

sunlight and particularly drying causes these two germs to die extremely rapidly.

A spoonful of bouillon in which either the spirochaete or the gonococcus is grown might be swallowed with impunity. If there were a crack of the lips, tongue or mouth an inoculation with syphilis might possibly occur, but the gonococcus cannot infect open wounds.

It is easy to see that only by understanding the germs of syphilis and gonorrhea, and the types of tissues that they can and cannot infect, can one reach a rational attitude toward both sexual and non-venereal infection, and thus prevent the above mentioned "phobia," which is possessed by those of "little learning," who being continually fed half-truths are not in position to judge and separate the gold from the dross.

The spirochaete cannot enter through the unbroken skin, but can enter any scratch, crack or fissure of the entire outside (skin) of the body; or any entrance point (such as the lips, mouth, tongue, throat, vagina, anus or rectum), which is lined by a modified skin which we term mucous membrane; or the female ovary may be inoculated by impregnation; or the blood stream is open to infection through transfusion by donors of syphilitic blood.

The gonococcus cannot infect the unbroken or the broken skin. It is extremely selective about its nesting place. It demands or let us say prefers the entrances of the body and only those parts lined with a special kind of mucous membrane (columnar). Hence in the female it will *not* infect the vagina, but will infect the urethra and the tiny glands

of both organs; it *will* infect the cervix (neck) of the womb, the tubes and occasionally the womb itself.

In female infants and girls the vagina is still susceptible as the mucous lining is still nearer the columnar type, a change occurring normally later.

In the male the urethra, its glands, and the prostate and vesicles are its objective.

What has the laboratory animal done toward helping to elucidate the problem of infection with these germs and how to prevent such infection in humans? The answer is: much and little. These germs are particular; they would preferably feed on human meat.

None of the lower animals can be inoculated with either disease, not even the lower long-tailed monkeys.

The higher anthropoid ape like the orang in his race with man up the Darwinian evolutionary ladder made a marvelous showing until this burst the bubble of his aspirations.

Could he get syphilis? Yes and plenty of it by inoculation with spirochaetes from humans or from cultured germs. He is almost to the top; nearly a human.

How about gonorrhea? The gonococcus was implanted in the ape's urethra many times; always with failure.

What a disaster to his ambition to be a human. He could get syphilis but he could not scale the last rung of the ladder. In mentality he equalled many humans but he could not substantiate his final claims to be the *equal of man*; he could *not* be an incubator for the gonococcus; *he could not develop gonorrhea.*

Having granted that the development of these

diseases requires inoculation with their germs in the proper location, it is self-evident that non-sexual infection must follow either personal contact with a carrier of the germs or with inanimate objects containing the germ-laden discharges.

Such contacts occur socially or in our daily routine of life both inside and outside of the home.

In the table to follow we have listed with no idea of completeness some of the usual things that may occur. Some of these have been popularized by Health Officers even to the point of making "phobes" of the public and unfortunately some of these have been partly or totally over-exaggerated.

We have used the symbols ++, +, ± and — opposite each item; these symbols mean respectively:— strongly, moderately, slightly contagious or not contagious at all.

These merely give *the author's personal opinion* of the danger of infection by either disease in each particular mode of non-venereal infection.

An attempted evaluation of some modes of non-venereal transmission of infection:—

Business and Personal Service	*Syphilis*	*Gonorrhea*
Food Handlers	—	—
Soda founts—glasses	++	—
Restaurants—cups, dishes	+	—
Barbers—Beauticians	±	+
Barbers' instruments	+	—
Public Places		
Strap hangers in subways	—	—
Toilet seats	—	±
Expectoration	++	—
Social Intercourse		
Hand shaking	—	—
Kissing	++	—
Servants in the home		
Nurse-maid	±	++

	Syphilis	*Gonorrhea*
Wet-Nurses		
Own child	++	—
Customer's child	++	—
Conditions in the home		
Bathtubs	—	+
Toilet seats	—	±
Used towels	—	++
Douche nozzles	—	±
Used handkerchief	—	+
Wearing other's clothing	±	+
Medical aspects		
Infection by blood transfusion	++	—
Infection of physicians	±	++
The patients' eyes	—	+

Food handlers have been a "football" to be kicked by Health Officers, Hospital Superintendents and others. Hardly a week passes but some of the hospital kitchen help are sent to me as Chief of Clinic to see whether they have syphilis or gonorrhea; in my opinion a pure waste of time. If they have, they lose their jobs in hospitals and restaurants. In no stage of the disease can they do any harm *in the performance of their duties.*

The regulations would discharge them from butcher-shops. Why? Is there an aesthetic feature behind it? There can certainly be no scientific basis for fear, if butchers wash their hands before cutting a sirloin steak. But even if they did not, and smeared that steak with spirochaetes or gonococci high and wide, we are going to cook it and if the saying is correct that "The only good Injun is a dead Injun," you may rest assured cooked germs will be *good* and *dead.*

Only the spirochaete may be transported on knives, forks, cups and drinking glasses; but there is little likelihood on dishes and there is practically no chance here if hot water and soap are used.

The hasty washing of glasses in soda fountains deserves much criticism and is a point for health authorities to improve or paper service should be instituted.

The barber himself may rub gonococci into a customer's eyes during a facial massage, if his hands are not well washed, but this is extremely unlikely.

His razor may have just nicked a syphilitic and with a little stropping is then used on you.

Much noise has been raised about these things, but we have never seen a case in point.

The regulations are pretty good, if the barbers can be made to carry them out. Small formaldehyde cabinets are part of the equipment of each barber for the sterilization of brushes, combs, scissors and razors but we have yet to see them loaded with formaldehyde producing tablets and used, except as a catch-all.

The need in the case of barbers and beauticians is continual inspection. Yet with it all, infection of syphilis or gonorrhea due to them must be extremely rare as I have never yet seen a case.

Infection of the hands from strap-hanging in subways seems almost impossible. The reputation of public toilet-seats has been greatly maligned; they cannot transmit syphilis and only in rare instances can gonorrhea be transmitted and then only to a woman or girl-child.

Expectoration can be a menace. Fresh sputum may contain living spirochaetes and they may enter an open scratch in the skin.

Social intercourse may offer a menace but not through handshaking. Indiscriminate kissing of the mouth can transmit active syphilitic germs which

may infect a slight crack in the lips. Fortunately the spirochaetes are probably present in the mouth only during the second stage of syphilis and then only for a month or six weeks.

Conditions in the home

This is a subject that we hesitate to discuss because of the danger of such discussion causing "phobia," yet a free exposition is one of the most important functions of a book of this sort.

Our intercourse with the outside world is a small matter compared with the chances of transmitting (sharing) these infections due to living conditions in the home. The bottom and the top of social classes are the most vulnerable; we must defend ourselves chiefly from squalor and servants. Fortunately, the wet-nurse is but rarely met with now. She should be examined for syphilis and so should our own child; both should have all consideration.

Among the poor the crowded sleeping in double beds is a menace and gonorrhea is very likely to be transmitted to girl infants or children. Infection of syphilis is not very likely in the home but bathtubs, toilet seats, used towels, used handkerchiefs and even douche nozzles are worth thinking about. Of course, most important is the infection of the eye with gonorrhea.

Nurse-maids in the home are only moderately important in transmitting syphilis, but I have seen eyes of children infected with gonorrhea and until exonerated they must always be looked upon as possible transmitters of that mysterious gonorrheal vaginitis of girl children.

Last and not to be forgotten is the infection brought home by big brother and big sister, who may not have been given thorough directions by their physicians in regard to safeguarding the family.

Medical aspects

The patient who receives into his veins the blood of another cannot acquire gonorrhea but he may acquire syphilis. Fortunately this can be safeguarded by the careful periodic examinations which are the rule in the case of professional and listed donors of blood. It should be remembered however that this technic may break down somewhat in emergencies especially when for certain reasons relatives offer their blood.

The non-venereal infection of the eye may most rarely be syphilitic but all gonorrheal eye infections are due to carelessness or accident. The gonorrheal patient himself may not have been thoroughly instructed about the care of his hands, especially about the infamous practice of using his pocket handkerchief as an emergency towel.

Accidental infection of Doctors

These do not occur often but even once is too often. When they do occur it is not usually due to carelessness but to accident. Eyes have been infected during irrigation treatments of patients.

Surgeons have had hands infected with syphilis in examining patients and also while operating due to punctured wounds and scratches of the operators' hands. Hang-nails and chapped hands are always

serious matters. Of course the same dangers face nurses and attendants.

Special precautions are all that are necessary for safeguarding in the case of the admission to hospitals of patients with active syphilis and gonorrhea. The attitude of hospital superintendents is to exclude them. This is in our opinion not only unscientific but reprehensible.

Looking back over the chapter we seem to have rather minimized the chances of transmission of infection by the non-venereal route. This has been arrived at not by a frivolous or iconoclastic attitude but is based on careful consideration of a large experience. The chief objective is to prevent exaggeration in regard to the transmissibility of these infections and so prevent a "phobia" in persons who have not the knowledge to develop a proper background.

However, in our experience the most serious aspect of non-venereal infection with syphilis is that the victim is practically never diagnosed early, and so slips into one of the later stages in which the diagnosis is not so easy and the possible restoration by treatment is not so complete.

Finally the unfortunate occurrence of innocent gonorrheal infection of the eyes and of the genitals of girl-children is a disaster, even if it only occasionally occurs.

The same might be said of other types, such as those of barber shops and beauty parlors. Though rare, one must remember that every one is exposed sometime and the number of contacts is enormous. With it all let us be careful, but let us arm ourselves

with information and so not become syphilophobes and gonophobes.

B. The diagnosis of syphilis:—Further data

In Book II the chapter on diagnosis has been greatly abbreviated and simplified. Due to this it was felt that it might be advisable to write on this subject at greater length and in greater detail, giving more information upon this rather complicated matter for those who might desire it, but attempting at the same time to maintain simplicity of description and exposition.

This book has been written primarily in order to give the layman an idea of certain important truths:—

That syphilis is a very prevalent disease.

That syphilis has certain typical modes of inoculation and certain unusual modes.

That in syphilis, in the development of the chancre, there being a long incubation or developmental period (14-44 days), it is not unlikely that the connection or relationship between the inoculation and the development of the chancre may be lost. This is of course more likely in non-genital syphilis.

That in syphilis there are certain stages (first, second, and third) and the first and the second stages have symptoms and signs which are more or less open to inspection.

That in syphilis these symptoms and signs of Stages I and II have a tendency to be self-limited; that is they disappear automatically in a certain reasonable length of time and after each of these periods there is a latent period which ushers in the next stage.

That in syphilis the healing of, or disappearance of a symptom or sign without treatment, or with slight treatment, does not mean that syphilis has been eradicated, but merely that a symptom or sign has disappeared and a new stage of latency has begun.

That syphilis can be usually diagnosed and cured, but early diagnosis is of paramount importance and the earlier the better, because the chances of complete cure are nearer 100% and the amount of treatment and observation is markedly lessened by such early diagnosis.

The idea of laying such a great number of statements before the layman is not to bewilder him, but to make it clear to him that we are not attempting in the few hours spent by him in digesting these pages to make him a physician and to enlist his recently acquired knowledge in the self-treatment of syphilis, and we are certainly not enlisting his aid in supervising the treatment administered by the medical aid sought by him.

Nor in urging him to read a chapter on diagnosis are we going to enlist his aid as a diagnostician as he is neither able to completely examine himself, nor is he professionally equipped to examine anyone else.

What then is the place that he occupies in this scheme of things? The answer is that his aid is enlisted in intelligently noticing various symptoms and signs that he may have and that may appear on his wife and offspring. By this education we hope that he will not overlook such signs through ignorance and carelessness and that, having noticed them, he will not through ignorance consider them unimportant or trivial, or take the attitude that "they will be all right in a short while," and so allow a

latent stage to deceive him into a false sense of security.

Most of these symptoms and signs *will disappear* in a short while, but that is by no means synonymous with their becoming "all right in a short while."

So the information which we allow him to get merely safeguards him against self-diagnosis or half-baked diagnosis and self-treatment and gives him a chance to present himself early before proper expert medical aid.

With this program in view is there still any reason why there should be a chapter on diagnosis for the layman to assimilate? My judgment seems to be in the affirmative, and the decision as to whether it is correct rests upon the development of this chapter.

The chief reason for a chapter on diagnosis is to define what diagnosis is, and how it can be made.

What are the diagnostic means at the disposal of present-day medicine? But more important, what is the *proper* way, and what is the *improper* way in which to use them.

In the last quarter of a century medical teachers have worshiped at the shrine of Laboratory Medicine to such an extent that many have obtained the impression, and transmitted it to others, that all that is necessary in diagnosing practically any disease is to examine some sort of specimen, like blood, and the whole diagnosis is made and the treatment follows mathematically.

This, of course, relates more particularly in certain types of diseases and, since the blood tests for syphilis were devised, syphilis became one of those that seemed to fall into this group more than any other disease.

Such simplicity naturally recommends itself to those that deal in "mass-medicine," and the Public Health officials are certainly of this tendency, particularly since they have graduated from their original function of Epidemiologists and Priests of Preventive Medicine, and gradually edged over into the realm of treatment, which should be the function of the practitioner of medicine.

So far so good, if this laboratory method of diagnosis and subsequent treatment is 100% satisfactory; but is it? We will take this up later, so for the present we are interested in showing the layman that there is more to the diagnosis of syphilis in its various stages than a mere blood test, and that the laboratory data should be merely used to assist the data obtained by careful history and examination of the patient and that when the laboratory test fails us, as it does at times, the expert physician is the last word in diagnosis.

In diagnosing syphilis a complete history and complete physical examination by a careful physician is of the utmost importance, as these findings may be the last word, even if only a tentative diagnosis is made by them, as the laboratory evidence may fail us for many reasons or may be confusing or not definite enough to stand by itself, while clinical findings may give us a diagnosis without or opposed to these reports.

In order to develop this line of thought let us approach our typical untreated case in the male, which has been used as a rack on which to hang more or less all of the symptoms and signs that a syphilitic *might* develop, and see where the laboratory evidence fits in, what its value is, and what its deficiencies are

in *diagnosis alone,* to say nothing of the question of its value in treating the disease.

The microscopical diagnosis of syphilis

Ordinarily no diagnosis of syphilis is possible until the development of the chancre. The patient, who has been exposed by way of a scratch or a herpes preputialis or the surgeon who has been pricked by a needle while operating, can do nothing but wait, although, if the body and blood of the host could be examined, evidence might be obtained which would make prophylactic measures on the possible victim justifiable.

When the chancre has appeared (Stage I), and a slightly ulcerated surface exuding serum is present, our first method of laboratory diagnosis comes into play, as the chancre or its serum is very likely to contain the spirochaetes, and they can be looked for with a microscope in the dried preparation or preferably in the live moist state.

These delicate spirals have a characteristic shape in dried films stained with Giemsa blood stain or preferably if mixed with India ink on a cover glass and allowed to dry. These methods are fairly satisfactory, but have never become so popular as the wet preparation or hanging drop examined with a dark-field microscope, as by this method *live spirochaetes* are to be found and their peculiar type of movement is an additional diagnostic feature which helps to differentiate them from other non-syphilitic spiral organisms.

If the serum of the chancre is obtained with very little mixture of blood, there is an excellent chance of

finding these spirochaetes and making a very early diagnosis, even before the blood could possibly develop even a faintly positive Wassermann reaction.

Numerically the chances of finding these germs in the first trial are great, but it is better to try two or three times, a day or so apart, rather than give up and wait for the blood to become positive which means general invasion of the entire body.

Difficulties in the microscopic method

Suspected lesions should never be examined if covered with talcum or certain antiseptic powders, as this may cause failure. Lesions that have been cauterized with silver nitrate or by other methods are likely to fail to yield the spirochaetes at that time. They should be treated with wet non-antiseptic dressings preferably of water or normal salt solution for a few days, and then examined repeatedly before giving them up.

The worst problem is the soft chancre, or chancroid in which the spirochaetes are not present, but suspicion is always levelled at these ulcers, even in the face of a negative dark-field test.

Masquerading as a chancroid is the *true chancre,* which has been allowed by filth and neglect to *soften due to a secondary infection by other germs.* Here the search for the spirochaetes may result in a failure.

Method of aspiration

In cases in which there is no ulceration of the chancre, a diagnosis may sometimes be made by injecting a small amount of normal saline solution into

the chancre or a lymph gland of the groin with a hypodermic syringe and needle; some of this fluid is then withdrawn and spirochaetes may be found.

The importance of finding the spirochaete must be stressed. After all, if found, we have a definite diagnosis which cannot be doubted. The diagnosis can be made early before the blood Wassermann reaction can become even slightly positive. The finding of the Spirochaeta pallida settles the diagnosis beyond doubt, whereas the Wassermann reaction is not absolutely specific, especially the slightly positive reactions.

The finding of the Spirochaeta pallida early before there is a general invasion of the body is a matter of paramount importance in the prognosis (outlook) and diminishes the amount and length of treatment and the chances for cure are more nearly 100% before the general invasion has occurred. The finding of the Spirochaeta pallida assisted by the gradual development of the positive blood Wassermann reaction has outmoded the old dictum of waiting for the development of the secondary symptoms (Stage II) in order to clinch the diagnosis, which was the best they could do in those days.

The blood test for syphilis

As the spirochaete gradually passes the barriers of the nearest local chain of lymph glands, usually those of the groin, there develops in the blood a substance which we term reagin or more commonly amboceptor. We will not even attempt to enter into the details of the method of ascertaining the presence of this material in the blood of the victim, as this is of

no importance to the layman. It is important that he know that in certain stages of syphilis and under certain conditions this material is to be found in blood, which can easily be drawn from one of his superficial veins, preferably an arm vein and allowed to clot; the fluid (serum) which separates from the clot is used for testing.

There are two types of tests that are usually done. The best known and first devised type is the so-called complement fixation test and the best known of these is the Wassermann test. The other type of test is known as the precipitin or flocculation test, and the best known of these, in this country, is the Kahn test.

It is hardly worth while to discuss the comparative merits of these two types of tests, made on entirely different principles. Both tests are usually done on specimens as a routine in most laboratories in this country and usually yield equally good results.

Evaluation of the Wassermann test

In discussing the subject of syphilitic blood examinations in this book, we may consider it synonymous with the Wassermann test, unless otherwise noted, as the medical public is better acquainted with the value and meaning of this test.

This type of testing and arriving at a diagnosis is a "two-edged sword," and while of great value at times is often negative for various reasons, and unfortunately is apt to be negative in 35-40% of cases in the third or true latent stage, in which cases it is most needed and would be most helpful.

Also the reaction, particularly in the blood, varies in its strength in the various stages and under various conditions, so that whereas in one type or stage of the disease a slightly positive Wassermann reaction might be said to be diagnostic, in another stage and condition a slightly positive reaction is of little or no value in diagnosis, yet possibly of value in gauging the course of treatment. Slight reactions are claimed by some authorities to be non-specific, which means that they occur in non-syphilitics. Slight reactions (one plus) cannot regularly be corroborated by other laboratories working even with a portion of the same specimen.

In the early days of the Wassermann test, even strongly positive reactions were looked upon askance, and about 1915 statements were made that reports of two laboratories could not agree even on strongly positive bloods, which led the author * at this time to check 1,000 bloods examined by him and his colleagues, against the results obtained upon these same bloods by the laboratory of Vanderbilt University, which proved to us among other things that two laboratories with standardized technics should obtain practically the same results on specimens of blood which were strongly positive to the Wassermann test.

Again some workers have reported the presence of strongly positive Wassermann tests in diseases like diabetes and other common diseases, but we have never seen this and prefer to think of them as latent syphilitics suffering in addition from other diseases.

* Simons, I., Jones, R. L. and Goddard, W. B. "The margin of error in the Wassermann reaction." Interstate Medical Journal, Vol. xxiii, No. 8, 1916.

The laboratory alone is not good enough

Yet in the midst of all this hurly-burly of technic, of non-specific reactions, of absence of reactions in real cases of syphilis, certain writers notably Public Health officials try to give the impression that the problem is so simple that it can be approached and solved by "mass-medicine" methods, carried out by hired technicians who need merely draw the blood, do a laboratory test, and mathematically the problems of diagnosis and treatment are solved.

In other words, "Give me your blood and I'll tell you what you are." Laws are even being introduced that call for obligatory tests on pregnant mothers, although it is known that these women, if syphilitic, are either in the tertiary stage, or have a *peculiar type* of syphilis which is peculiarly free of signs and may give a considerable percentage of negative tests.*

Authorities with such a bias consider that the ideal method of attacking the problem is "mass-medicine." Their ideal is a clinic directed by a competent syphilologist; the assistants need not necessarily be even physicians, as technicians or nurses can draw blood and inject medicines, and it is being done in some clinics. So why worry about the physician? An attempt has been made to explain plainly and explode the idea that syphilis can be handled to the *best advantage* by such a method, or that it can even be handled to a *pretty fair advantage.*

As a laboratory research worker, clinical pathologist and specialist in Urology of more than twenty-

* See Statistics of Jeans and Cooke, Book II, Chap. 4.

five years' duration, the author * wishes to accentuate the *paramount* importance and position of the history and physical examination of the patient with syphilis, as well as the other so-called venereal diseases, both at the time of the original attempt at diagnosis and also from time to time during the course of treatment, and by this we do not mean the *casual use of these methods of diagnosis* that *preceded even the laboratory era.* This is not only *not* a "fifth wheel" on the wagon of the laboratory diagnosis of syphilis, but *on the contrary* it is the church of which the laboratory work is the steeple. Without the clinical examination the laboratory results cannot in many instances be properly evaluated for the purpose of either diagnosis or treatment.

We are by no means laboratory nihilists, but the percentage of failures in diagnosis is too great if we lean too heavily on these laboratory methods without evaluation of them by clinical methods.

The rational or clinical method of diagnosing syphilis

Having made it clear that I am not minimizing the value of laboratory methods in the diagnosis of syphilis, yet I feel that the custom of resting too heavily on them is putting the cart before the horse, we are going to insist that the attitude be changed, the process reversed to normalcy and that syphilis be approached like any other disease in the logical and rational manner.

* The author is not only a Urologist and contributor of articles and researches on Urology, but also on laboratory subjects along the lines of both Urology as well as syphilis and gonorrhea. Incidentally he holds a permit as Director of Laboratories from the Department of Health, Bureau of Laboratories of the City of New York.

History taking in syphilis is an art

The facts elicited by taking the history of a case of syphilis are only of importance if they are positive. In a disease so protean and of so long standing as syphilis, as it may either extend over only a few weeks or over a lifetime, and in which symptoms may be slight, over-looked, forgotten or often incorrectly diagnosed years before, it is necessary that the physician run the gamut of all regions and organs of the body. This is no matter for the layman, and hurry or careless questioning by the examiner has no place in such a procedure.

The physician must know all the symptoms of syphilis in order to take a proper history.

The history and physical examination are here treated as one, as both are intertwined, and a discussion of certain indications for the performance and evaluation of laboratory tests must be combined in this discussion in order to conserve space. We are thoroughly aware of what we are doing in making this mixture, but it is exactly the way in which the alert physician thinks and works.

Let us again fall back on our *typical case* of untreated syphilis described in a previous chapter.

If a history of exposure either through sexual contact or otherwise be obtained, two things may happen after the inoculation.

The usual thing is that the abrasion or laceration of the skin heals, but before the chancre appears, an *incubation or apparent rest period* of at least two or three weeks must elapse. A history of a sore that appeared in a very few days after the exposure is usually that of a chancroid, a non-syphilitic sore,

although, in cases where the exposure occurred every few days, no definite "incubation period" can be determined for the lesion.

The usual thing that may happen is that the abrasion, and very often it may be an erosion of a herpes preputialis *does not heal at all* and while it does not look like a syphilitic chancre in the short span of a few days, yet spirochaetes can be found. Such a picture is particularly likely in true chancre of a non-venereal type, like those of the finger. A history of a slowly healing extragenital wound which took a month or so to heal is very important. While the minute characteristics of the various initial lesions are important and should be noted carefully, the finding of the Spirochaeta pallida is of first importance for the early diagnosis of Stage I, and it is here that the laboratory shines.

Again a typical initial lesion and its association with different types of glands in the groin will not be minutely described and discussed, as these points are for the physician.

However of greatest importance is *what is to be expected by the patient or layman when the spirochaetes are not found.* Is he to be allowed to wait until the full blown secondary symptoms (Stage II) appear, as was good practice before 1905? *Unquestionably not,* as this means an overwhelming general invasion of the entire body, which is borne out by the fact that the blood becomes *strongly* Wassermann positive. It is here that the laboratory, if properly used, is a great boon. The Wassermann reaction cannot become diagnostically positive (3 to 4 plus) until the latter part of Stage I; but by doing a Wassermann test every few days, the presence of

a repeatedly slightly positive Wassermann reaction (one plus) is diagnostic in conjunction with the presence of a suspicioned lesion, although one ordinarily requires a strongly positive Wassermann reaction (3 to 4 plus) for diagnosis of tertiary latent syphilis.

The quantitative Wassermann test

This is really synonymous with the quantitative method of reporting the Wassermann test (or other complement fixation tests) to the physician, and the laity are already pretty well informed as to this method of reporting. Much criticism has been heaped upon this method, but it has its roots too well sunk in the minds of physicians for it to be easily eradicated. Ordinarily the reports give the following degrees of positivity: slight (plus minus or one plus), moderate (2 plus), and strong (3 to 4 plus). Then again such reports are usually differentiated into reactions in which an acetone insoluble fraction antigen is used, or an alcoholic antigen, which contains a very small amount of cholesterin or a cholesterinized antigen, or the report may be a combination of the results obtained with two or more of these antigens.

For the physician the report has several anchor points: A strongly positive Wassermann reaction *means syphilis,* even without history or examination, and regardless of the presence or absence of physical signs and usually demands treatment. With a weak or even moderate reaction, if he is certain the case is syphilis, it means continuance of treatment.

A weakly or moderately positive reaction requires for diagnosis an excellent history and clinical physi-

cal signs (scars, etc.) in order to use it diagnostically, especially when the tertiary (latent) stage is suspected. When found in the late primary stage it reaches its greatest value in diagnosis and really marks the beginning of the Wassermann positive stage of the disease, the serological division of syphilis, which is more logical than the old and customary clinical division into three stages. (See Book II, Chap. 3, Footnote, Page 131.)

The provocative Wassermann reaction and the Herxheimer reaction

It has been noticed that the negative Wassermann reaction or the slightly positive Wassermann reaction in *untreated* cases sometimes becomes positive or more positive a day or two after an injection into the vein of a small dose of one of the arsenicals like arsphenamine. This procedure is often of great value in cases for diagnosis.

It is of most value in early cases (Stage I) which have not yet reached the secondary clinical stage (Stage II). The meaning may be that the sudden destruction by the arsenical of more spirochaetes than the defenses of the body have of themselves been able to do at that stage, throws an excess of disintegrated germ-products into the blood stream and a sort of vaccine or protein reaction results with sudden antibody formation; if so, this is true passive immunization. At any rate the reaction sometimes occurs and is of value in diagnosis.

Such a diagnostic feature is further enhanced by the Herxheimer reaction. The best example of this is the sudden appearance of a typical spotted rash or

roseola, just like that of secondary syphilis a day or so after the injection of arsphenamine. This is most likely to appear in the late primary cases which have been so injected. In such cases if the spirochaetes have not been found and the Wassermann reaction is still negative, the astute physician does not desire to wait for the true secondary stage, with its regularly positive blood Wassermann reaction. A Herxheimer rash is not the beginning of the secondary stage, but is a pseudo-secondary sign, and is probably a bacterio-protein phenomenon. Incidentally in classical latent syphilis (Stage III) dramatic neurological phenomena may occur with involvement of nerve-cells, nerve centers or nerves with results such as sudden deafness, or even sudden blindness (the latter more often in Stage II), which may be very serious or may react favorably and resolve when treatment is pushed further.

The plus reports in the Wassermann reaction

These are an annoyance to the physician because the layman has acquired "a little learning" about the test and the number of pluses through general information and from the Public Health writers. They have gone so far as to lead him to believe that a negative blood test is all that is necessary to relieve his mind of the possibility of syphilis. This is certainly not true.

He has been told that four plus is maximum and, if reduced to zero, he has nothing further to bother about, and many other half-truths. All such half-truths are very devastating as they give him *a false sense of security,* or they make him feel that the

whole affair is merely a matter of mathematics. These reports often cause him to distrust his physician.

Wassermann-fast cases and the titrated Wassermann test

Even many physicians are told and believe that four plus cases are maximum and that all cases that have four plus Wassermann reactions and do not react rather promptly to at least a two plus are hopeless, and termed "Wassermann-fast cases," whereas as a matter of fact four plus is not the strongest reaction that could be reported, but has unfortunately become synonymous with maximally positive. Many sera can be diluted many times before testing and will still give a four plus report, which means that they are many times four plus. If such bloods are slow to become less than four plus under treatment, they are often called Wassermann-fast or irreducible, and consequently hopeless cases, whereas this may not be true, and it may be that they *are being reduced* by treatment, but are not yet in a zone in which the reading of an ordinary test can show reduction.

Such a situation might be cleared up by a *titrated Wassermann test.* This will not be done by the serologist unless specially requested. These cases most often occur in syphilis of the brain and are said by most observers to be irreducible by treatment.

The negative Wassermann reaction in cases for diagnosis

The laity is being told a half-truth through the Public Health information and other channels, that

a negative Wassermann test is proof that syphilis is not present and the impression is given that this is: "All ye need to know."

In order to explain the fallacy of such teaching, we must understand certain cardinal principles underlying the Wassermann reaction. The material looked for is reagin or amboceptor, a biological substance due to the reaction of the body defenses against the syphilitic *antigen,* which is either the spirochaete or something elaborated by it or caused by its activity.

Consequently *reagin* depends primarily upon *spirochaetal activity* in the body.

Most amboceptors are eliminated from the body within a few months after the activity of the antigen, the causative factor, ceases. Consequently a negative Wassermann reaction must be due to underproduction or lack of production of amboceptors, provided that enough time has elapsed to clear the blood of their presence. In curing syphilis with chemotherapy we are not destroying reagin, but preventing its production by killing spirochaetes. Reagin will thereupon disappear automatically from the blood.

With such a background it is easy to see that a negative Wassermann reaction is not synonymous with the absence of syphilis, nor with the cure of it. It is a non-committal report, guaranteeing neither of these conditions.

By a negative Wassermann report the laboratory man does not say: "No syphilis," he merely says "No reaction." His province in such a situation is to make a report; not to make a diagnosis.

The negative Wassermann reaction in cases under treatment

Its absence has already been partly discussed (See: Diagnosis of primary syphilis). It is rarely even slightly positive before the 10th to the 14th day of Stage I. It *may suddenly become positive* or more strongly positive in any stage after administration of arsenic or a heavy metal. This we call a provocation, which is the serological evidence of spirochaetal death, or its sequela and is clinically called a Herxheimer reaction, when it occurs in the skin or central nervous system.

Such an artificially and hence quickly developed strongly positive Wassermann reaction is not necessarily of bad import; it probably means that some of the spirochaetes which are for the most part locally massed in the chancre and inguinal glands, and many of those which have passed the first line of defense and are scattered throughout the body, have been reached by the drug and a reaction has suddenly occurred. Either all the germs, or nearly all, are suddenly destroyed and the blood becomes negative soon after, as soon as the reagin is eliminated, as no more reagin is being elaborated to keep up the positivity of the blood.

It does not however guarantee that some of these general invaders have *not* escaped death. In fact some authorities claim that spirochaetes reach the central nervous system in the very early days of Stage I, and we know that this region is difficult to reach by intravenous chemotherapy at any time. We however are not so sure of this claim and hence are *not* so pessimistic.

On the other hand we hold that the *gradual or regular development* of a strongly positive Wassermann reaction is an entirely different matter; such a condition occurs in the late primary or the manifest secondary stage and is evidence of the fact that there is a marked general invasion of the blood by the germs (a spirochaetemia or bacteriemia), in which the germs are found in large numbers in every tissue and organ of the body. Such a condition demands *long* and *continuous* treatment.

The spirochaetes *will not succumb to a dose or so* of chemotherapy and while we are very optimistic of ultimate cure, no guarantee can be given on account of the tendency of the germs to remain entrenched and dormant in outlying and important locations, such as the central nervous system. However the fact remains that apparently the earlier such cases are put under active treatment, the sooner does the blood as a rule become negative and the sooner do the clinical signs disappear.

The disappearance of the Wassermann reaction requires time, even after all the spirochaetes are killed off; of course we refer again to the fact that it requires a month or so for reagin in high concentration to disappear from the blood. On account of the lack of understanding of these facts at that time, even the great Paul Ehrlich thought that one dose of Salvarsan (arsphenamine) would be sufficient to kill *all the spirochaetes in the body,* regardless of the stage of syphilis.

He thought that by one dose it would be possible to produce a "Great Sterilization" of the spirochaetes in the body, the doctrine of "Therapia Sterilizans Magna."

While this did work out in some early (Stage I) cases, it was soon found that it was a failure, even in *some of these cases* and certainly in all the Stage II cases. It was an outburst of *overenthusiasm* in a genius.

At present, many authorities treat even primary cases, that have never developed even a weakly positive Wassermann reaction, for inordinate lengths of time, even for years. The underlying idea of this conservatism is, that there is no *direct* method by which one can ascertain when all the spirochaetes are killed. We are forced to use an indirect method, which is the *repeated Wassermann reaction*, and, on account of the period necessary for reagin to disappear from the blood stream, we are unwilling to stop treatment and to wait several months in order to ascertain this fact. We feel that it is better to *overtreat* than to *undertreat* syphilis. Consequently, this has developed into the idea of the *continuous* rather than the *intermittent* schedule of treatment with its rather long rest periods.

However this much is certain, that under chemotherapy, the clinical signs, if there are any, disappear; next the Wassermann reaction, as a rule, diminishes in intensity and finally becomes negative. Experience shows that in cases that have a strongly positive Wassermann reaction this does not ordinarily occur in less than two to three months, part of which time is necessary for the elimination or extrusion of the reagin.

Authority says now that we may have reached a cure, but to be on the safe side it is better not to assume this. However some feel that there is a rationale for *rest periods* from active treatment. The

reason for extreme conservation in declaring a cure is based upon several things:

1. The spinal fluid may show signs of change, even with a negative *blood Wassermann reaction.*

2. There is a great tendency for the negative Wassermann reaction to relapse and become positive again.

The relapsing of the Wassermann reaction in a rest period or even under treatment can mean but one thing, that a latent dormant focus has again become active and, while most of these lesions are probably in the internal organs and cannot ordinarily be reached by examination, yet the central nervous system offers cerebrospinal fluid, which is easily procurable for examination.

It is therefore necessary in the cases, the blood of which has become negative under treatment, to test out the spinal fluid. We will not go into the detail of the tests and their value and interpretation as this is taken up in another section. It is sufficient to say here that if a fluid shows any degree of positivity to Wassermann, Kahn or Lange tests, or even shows an increase of cell count or globulin, the patient should not be considered cured and anti-syphilitic treatment should be resumed.

Such cases may be considered in the category of either merely uncured syphilis, or, as some would have it, as *asymptomatic neuro-syphilis.*

The spinal fluid and its tests

Up to this point the term Wassermann reaction has been used to signify a test made on the blood of the subject for the diagnosis or the treatment of

syphilis. We must now mention the fact that, in addition to this, it has been found that information of major importance may be elicited by examination of the spinal fluid and that no *examination* of a subject is really complete until this fluid is drawn and thoroughly tested.

Also as will be later shown, no *treatment* of a syphilitic is complete until the spinal fluid has been examined and proven normal to all recognized tests.

The spinal fluid is ordinarily not difficult to procure. It is drawn with a special slender needle which is inserted into the lower part of the back in the mid-line just above the hips. After carefully cocainizing the skin the needle is inserted into the spinal column (usually between the fourth and the fifth lumbar vertebra) and the fluid usually drips out drop by drop but at times may come forth under considerable pressure.

The spinal fluid is normally a clear colorless fluid which looks like pure water. It bathes the outside of the spinal cord, which is a continuation of the brain, and also the outside of the brain itself. It also bathes the hollow cavities inside of the brain, and these cavities are continuous by means of a small opening with the main collection of spinal fluid which is situated outside of the brain and cord, lying between the hard (dura) and the soft (pia) membranes, the latter of which forms the outer coating of the brain and the cord.

The spinal fluid becomes changed if inflammation of *any type* attacks the brain and especially the pia, and modern investigation has shown that in syphilis the spinal fluid may be clear and limpid as water and yet show on various laboratory examinations

changes that are of great value both for diagnosis, treatment and outlook.

Ordinarily in testing the spinal fluid, when syphilis is suspected, one is interested in the following items:

1—The cell content; 2—The globulin content; 3—The colloidal gold reaction; and 4—The reagin or amboceptor content.

Normal spinal fluid contains almost no cells (up to five per cubic millimeter) and is negative to the other three mentioned tests.

In some cases in which the brain or spinal cord or both are involved in the usually slow and insidious infection by the spirochaete, there are changes in the fluid, and these changes in these four directions or features can be detected by various well recognized tests or methods.

1—The cell count:

In neuro-syphilis the cells that are found are usually round cells. They usually increase in number to 20-50 per cubic millimeter, but may increase to hundreds or more.

2—The globulin content:

This may be present in slight, moderate or large amount in neuro-syphilis. The tests used for globulin are usually Nonne's or Noguchi's.

3—The colloidal-gold test of Lange.

This test is negative with normal spinal fluid. In neuro-syphilis it is positive and general paresis and tabes very often give a maximally strong test, but there is no differentiation between these two diseases by means of this test. The remainder of the cases of neuro-syphilis, often termed cerebro-spinal syph-

ilis, often give a weaker test known to some as a mid-zonal reaction.

4—The reagin or amboceptor content:

The presence of reagin (or amboceptor) in spinal fluid is the most important finding. As in the blood it may be detected by the Wassermann test. It is generally considered that the material (amboceptor) which is detected by this test, is elaborated by syphilitic inflammation in the cortex of the brain when associated with inflammation of the pial membrane. Certain it is that the reaction is strongest in the spinal fluid as well as in the blood of the cases of neuro-syphilis that are termed general paresis. In fact these cases are in many instances considered to be Wassermann-fast, which means that their blood and spinal fluid Wassermann tests can not be reduced below a strongly positive reaction; some observers however claim that this so-called Wassermann-fastness is merely a very high titre or concentration of the amboceptor. (See the section on the *titrated Wassermann test.*)

In the case of tabes the spinal fluid Wassermann test may vary from absolutely negative to strongly positive.

The same may be said for the other syphilitic involvements of the nervous system, known usually as cerebrospinal syphilis.

As for the other tests (such as the Kahn test), they will not be discussed here for the same reason that was given in the case of the examination of the blood for syphilis, namely that in this presentation we are limiting ourselves to the Wassermann test in the search for syphilitic amboceptor.

The meaning of the spinal fluid tests

This is a rather difficult subject to be discussed as certain features are somewhat controversial. However there are certain facts and conclusions that are quite generally agreed upon and we will give them, realizing that even some of these may be considered by some to be somewhat controversial.

It is quite generally agreed upon that the mere presence of a positive Wassermann reaction in the general blood stream does not necessarily affect the spinal fluid. The presence of a positive Wassermann reaction in the spinal fluid means a *localization* of the spirochaetes in the *brain or spinal cord* and *particularly in their coverings* (the pia).

Furthermore it means an *active inflammation caused by these germs in that region.* It is not only possible, but very frequent, that one may find a *completely negative* Wassermann reaction in the *blood* and yet not only changes in the spinal fluid, but *actually a strongly positive Wassermann reaction.*

In other words there seems to be no connection between the fluid of the blood and the fluid of the spinal canal or at least there is no *reason to believe* that the syphilitic amboceptor, that is identified in the Wassermann test, can or at least does filter through from the blood stream to the spinal fluid. In other words the deduction most logical is that the amboceptor found in the spinal fluid is *produced in the cerebrospinal canal* by the brain and spinal cord, and is *evidence of the local action* of the spirochaetes in those organs, and consequently treatment for syphilis should be continued until this fluid be-

comes normal and remains normal for a number of years.

C. The difficulty in locating the elusive gonococcus

If gonococci are not easily found in the first examination made of a discharge, it is usually very difficult to find them by either the microscopic method or by growing the germs in the laboratory (cultural methods). The chief reason for this is that the germs have a tendency to "dig in" and, when they do this, they do not constantly cause local inflammatory reaction. Consequently the discharge, if there is any at all, is very thin or very slight in amount and is not regularly present.

In such instances special instruments and special methods are necessary in order to recover *even a specimen* of secretion for examination. Such methods of course belong usually to the domain of the specialist in Urology, but occasionally to that of other specialists.

In this discussion we are limiting ourselves to the actual recovery of the gonococcus, the direct evidence of gonorrheal infection.

The following places yield the pus or fluid which might contain the gonococcus:

In the Male:

1. The urethral tip.
2. Follicles in the urethra especially near its tip.
3. From the fluid obtained from the ure-

In the Female:

4. The urethral tip.
5. Massage of the follicles, especially at the tip of the urethra (the mouths of Skene's ducts).

In the Male:—*Cont.*

thra after *rectal* massage of the prostate gland and vesicles.

In the Female:—*Cont.*

6. The openings of Bartholin's ducts in the vagina.
7. The secretion of the adult vagina.
8. The secretion of the vagina in infants and small girls.
9. The secretion of the cervix (neck of the womb).

In Both Sexes:

10. The eyes; especially the purulent or sticky discharges from the inflamed eyes of new-born infants; inflammation of the eyes can also occur at any age.
11. The urine passed or drawn from the bladder by catheter.
12. The urine obtained by special methods separately from the right or the left kidney.
13. Discharges of pus or mucus from the rectum.
14. From swollen and inflamed joints; the fluid is obtained by puncture and withdrawal by means of a hypodermic syringe and needle.
15. From the blood; very rarely gonococci may be cultivated from the circulating blood taken from the veins (blood culture). It means usually fatal disease of the heart valves (gonococcal endocarditis).

The blood serum test for gonorrhea, a test similar to the Wassermann test for syphilis is, if positive, an

indirect evidence of the activity of gonococci somewhere in the body. It has been discussed in Book I, Chap. 5.

D. The progress of a case of untreated syphilis

In Book II, Chap. 3, we discussed the course of an untreated case of syphilis through the *three* clinical stages, and discussed in turn a long list of symptoms and involvements of various tissues and organs of the body, making it clear that *no individual case* would have or be likely to have *all of these lesions and complications.*

Our effort was to convey to the reader the fact that syphilis was a disease with only a few signs that he could or would be likely to notice. Many of those on the surface of the body are very slight and often very evanescent and could consequently be very easily overlooked, because the disease typically has *three latent periods,* the *third* of which is generally referred to as *the latent period.* During these periods the victim may be and usually is totally unaware that there is anything wrong, especially when the diagnosis is not definitely made in the first or second stages, which precede the first and second latent periods respectively.

It is difficult to develop a chart which will give the progression and recession of the symptoms and signs and their time-relation to the various laboratory tests that can be done on the secretions, the blood and spinal fluid, because one is compelled to be very pedantic and didactic, and this does not always work out in clinical medicine.

However we give this chart for what it may be worth, hoping that this skeleton framework will help the reader in visualizing the course of the disease, making it clear that this is the life-history of an *untreated case.*

COURSE OF AN UNTREATED CASE OF SYPHILIS

	Clinical Signs	Period of development in days	Approximate number of days from day of infection	Laboratory Tests
	A—The Scratch	A-B (1-3)		
First latent period	B—Healed Scratch C—Development of Nodule D—Nodule (lump)	B-C-D (14-21)	(3) (21)	Spirochaetes obtained by aspiration
Stage I	E—Ulcerated nodule (Chancre) with glands in the groin	(14-28)		Spirochaetes obtained from serum of sore or aspirated from glands of groin Wassermann Reaction may become (1 plus) on 31st day
Second latent period	F—Healed ulcer	(14)	(39)	Wassermann Reaction increases to (2-3 plus)
Stage II	G—General Symptoms: Rash Sore throat Falling out of hair	(30-90)	(53)	Wassermann Reaction becomes 4 plus by 53rd day
Stage III or third (genuinely) latent period	H—Disappearance of general symptoms	3 years to a lifetime	(143)	
	Symptoms may be: 1—Latent until death 2—Of skin or internal organs 3—Of brain or spinal cord			Spinal fluid abnormalities, if found, occur usually after 183rd day; but may occur in Stage II or even in Stage I.

It might be well at this point to stress the fact that, however difficult and prolonged the treatment may be which is necessary for complete cure, syphilis is nevertheless one of the easiest of diseases to get under control and to be rendered more or less non-infectious by a modicum of treatment. Consequently it is easy to realize that in an early case, in which the diagnosis is not very clear, it is very dangerous to give a small amount of treatment and to use the amelioration of the signs as a "diagnostic point"; this is commonly referred to as the "therapeutic test," or diagnosis by means of treatment-methods.

Also in later cases which have been under sporadic or incomplete treatment, and thus driven into a period of "latency," diagnosis may become very difficult because the entire picture is changed to one which possibly simulates normalcy or cure.

It might also be well to give at this point a list of some of the more commonly attacked organs and the lesions that occur in the acquired syphilis of adults in the tertiary (latent) stage, as well as in congenital syphilis of infants (early stage) and of older children (later stage), so that the reader may easily orientate himself on the discussion found in Book II, Chap. 3.

Symptoms of tertiary (latent) syphilis

Skin: Ulcers of shins; scaling palms

Hair: Moth eaten appearance of scalp; patches of baldness

Eyes: Drooping eyelid (usually of one side); irregular or very small pupils; iritis; diplopia (double vision); retinal hemorrhages; optic nerve atrophy (with progressing blindness)

Ears: Deafness
Tongue: "Geographical tongue"
Extremities: "Charcot's joints" (usually of knee or elbow); perforating ulcer of the foot (usually in spinal cord involvement)
Male genitals: Tumor-masses in the testicle
Heart and blood vessels: Hardening of the coronary arteries (the arteries supplying the heart muscle itself); aneurism (usually of the aorta); myocarditis (degeneration of the muscle of the heart itself)
Liver: Cirrhosis (often with fluid in the abdomen)
Rectum: Stricture (masquerading as cancer)
Central nervous system: Apoplexy; paresis; tabes; cerebro-spinal syphilis

Symptoms of early congenital syphilis

Skin: Rashes anywhere (usually of the palms and soles); cafe au lait complexion
Nose: Coryza (snuffles)
Mouth: Fissures of the lips (cracks); mucous patches
Abdomen: Enlarged liver and spleen
Genitals: Fissures of anus; condylomata
Extremities: Tenderness of the joints (epiphysitis)

Symptoms of late congenital syphilis

General: Under-sized; anemic; mentally retarded; bleary-eyed
Head: Small size; bony irregularities
Eyes: Keratitis; choroiditis
Teeth: Deformities (Hutchinsonian teeth)
Nose: Saddle deformity (most common)

Palate: Perforations
Skin: Punched-out ulcers; shin-ulcers.
Extremities: Saber-tibia
Central nervous system: Acute meningitis; may be like tertiary syphilis of the adult

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